THE METAL INDUSTRY
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NEW SERIES
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IMMERSION OR DIP GOLD SOLUTION.

By R. H. Sliter.

After running cyanide, salt water and dip gold solutions, I have come to the conclusion that a dip gold bath, if run in the proper way, is cheaper and also an advantage in turning out work in large quantities. Some time ago I was called upon to turn out a large number of figures made from antimonial lead (see illustration); the order called for 13,000 and had to be delivered in eighteen days.

We had to plate at the rate of 750 figures a day, and a working day consisted of only eight hours. The figures had to be run through the copper solution, dipped and flashed in a brass solution and then gold plated. The firm figured at the rate of only five cents for the plating and finishing, and it was up to the plating department to produce the goods at this price. After running two gross through the cyanide gold we found that we were way above the limit of cost. The result was that a "dip" gold solution was installed, and when the order was completed the figures had been gold plated at the rate of $2.15 per gross, while in using the cyanide the average was $8 per gross.

ANTIMONIAL LEAD FIGURE GOLD DIPPED.

I do not claim that this solution will answer the purpose for all classes of work, especially where a high-class article is called for, but I will vouch for it on ordinary work. I know of this solution in some of the large brass factories in this country where they produce novelties, buckles, etc., and it is claimed by them that this is the only one suitable for turning out large quantities of work, at the same time giving good results as to finish.

I have heard of platers that throw up their hands at the mention of a gold solution, run in an iron kettle. One plater in particular, a man of a great many years of experience, who, when he saw the solution, condemned it as no good, and said he would give two hundred dollars for the kettle, after it had been in use six months; his idea being that the kettle would take up or absorb the gold in large amounts.

I knew he was wrong and misled; I was of the same opinion myself and at one time I had occasion to send an old iron jacket kettle, that had been in use for five years, to the refiners to recover the gold that I supposed it had absorbed. They reported, however, that it contained not even a trace of gold. Judging from this experience I am of the opinion that all of the gold put into this solution can be worked out the same as from any other solution, and I would advise using a cast-iron steam-jacketed kettle.

Before making up solution, see that the kettle is clean; I should advise boiling out with a solution of sal soda, for about one hour and then rinsing with clean water. Fill the kettle with water, bring it to a boil, add 4 lbs. c. p. yellow prussiate of potash, 2 lbs. c. p. carbonate of soda, continue to boil until chemicals are all dissolved, add 1 oz. fine gold (reduced to chloride) with 3 oz. caustic soda. Boil solution for one hour and it is then ready for use.

I have found that the action of this solution is not as quick as other gold solutions. The solution should stand about 15° B., while working see that the solution is constantly boiling. To keep the solution in a normal condition will depend on the plater's judgment. Chemicals will have to be added from time to time. I would advise not to allow the bath to drop below 10° B. in density. In adding to this solution always add both chemicals in the proportion of two parts of yellow prussiate of potash and one part of carbonate of soda.

I know of platers using sesqui-chloride of iron, but I do not see the advantage in using this one chemical as this solution has a tendency to act on the iron, thereby causing a contamination of the bath, which is objectionable. I have tried to run this bath in an enamel-lined tank but met with no results; have added sesqui-chloride of iron but could not work it to any advantage or get the same good uniform production as from the iron kettle. The above formula is for ten gallons of solution; for one gallon use:

6 ozs. yellow prussiate of potash.
3 ozs. carbonate of soda.
¼ oz. caustic soda.
2 dwt. gold.

A METHOD OF MAKING ARTISTIC LAMP SHADES.

By L. Schulte.

In the December (1907) number of The Metal Industry there was an article on "Artistic Metal Goods Produced by Slush Molds," by Charles H. Proctor, in which the methods of making slush mold castings such as portable stands was described. In the present article I will give the readers of The Metal Industry an account of the methods used in making leaded glass shades for gas and electric portable stands.

The Tiffany Glass & Decorating Company was the first to manufacture lamp shades consisting of pieces of colored glass soldered together; later on a few other firms took up this line, among them Duffner & Kimberly Company, of New York, who produce lamp shades and whole lamps of all styles and colors.

This industry, which has grown up only within the last few years, has developed partly out of the manufacture of church windows and partly from that of mosaics. Most of the lamps and shades are of the classical style: Greek or Roman, but the Renaissance and modern styles are not uncommon.

AN ARTISTIC LAMP SHADE.

There are five steps in the manufacture of lamp shades:

I. Design of the model.

II. Cutting of the glass.

III. Fastening strips of copper foil on the edges of the pieces of glass.

IV. Soldering together the glass pieces.

V. Finishing and coloring the metal parts.

The design of the model and the tasteful selection of colors require a thorough understanding of the subject on the part of the designer. First of all a wooden form is prepared by a turner or pattern-maker, which has the same shape and size as the shade. The designer draws the pattern for the metal parts on this form and burns the lines into the wood. Between these lines the colors to be used for the glass are then filled in with colored crayons. Since the design usually repeats itself three or four times, it is necessary to color only a third or fourth of the pattern. When this operation is finished small patterns (for the glass-cutter) are cut from sheet brass for each of the variously shaped pieces of glass. No patterns, however, are made for those pieces that have only straight edges. The glass-cutter, who should have a large assortment of colored glass plates, chooses colors to match those of the wooden form and cuts pieces according to the brass patterns. These he fastens to a white glass plate with some colorless varnish, in the same arrangement as on the wooden form. He has thus a pattern in glass, which he preserves so as to be able to duplicate the colors at some future time. With this pattern placed before the window near his table the glass-cutter begins his regular work, with diamond, brass patterns, rule and forceps. Since many of the pieces of glass required are similar he places all of one kind in a little pile on a board.

When the glass-cutter has finished his work, the board with the pieces of glass is carried to the boys or girls who fasten the copper strips on the edges. This work is done as follows: Sheets of thin copper foil about 6 by 20 inches are coated on one side with a hot mixture of one part rosin, two parts yellow beeswax and three parts of rape-seed oil. The mixture dries quickly to a sticky mass. The waxed foil is then cut up into narrow strips, somewhat wider than the thickness of the glass. These strips are stuck on to the edges of the pieces of glass and the edges of the copper strips folded over so that all the edges of the pieces of glass are covered by these U-shaped strips of copper. The boys or girls doing this work must, of course, replace these pieces in the right order on the board.

When this work is finished, the board is carried to the solderer, who arranges the pieces of glass closely together on the original wooden form, according to the design and fastens them in position with small pins. The solderer now moistens the copper strips with the soldering solution and quickly and skilfully solders together the exposed copper foil, using a soldering iron and long, thin strips of solder having a composition of 50% tin and 50% lead. The skill of the solderer lies in the obtaining of a uniform flow of solder; any irreglarity in the soldered joint not only looks bad, but renders the finishing and coloring of the shade more difficult.

When this method was first used several difficulties had to be overcome. First, it was hard to find a suitable soldering fluid and second, there was trouble in finding a process for plating and oxidizing the soldered joints, which would not injure the appearance of the glass or make it dull or dirty.

The ordinary soldering fluid made from hydrochloric acid and zinc was too acid and the various soldering pastes were still less suitable. Fnally a satisfactory fluid was found; this anyone can prepare as follows. Add zinc to one gallon of hydrochloric acid until no more will dissolve, then add one gallon of glycerine and one-half gallon of alcohol. In another vessel dissolve two pounds of ammonium chloride (salammoniac) in one quart of water and mix the two solutions. The soldering fluid is now ready for use. By the addition of a little zinc carbonate the fluid can be made entirely free from acid.

When the solderer has finished the outside of the shade and has fastened the usual brass ring at the top he lifts the shade off the wooden form and solders all the copper

strips on the inside of the shade. He finishes his work by soldering the lower edge of the shade.

In this way a lamp shade can be made which excels all others. The cost of the shade depends upon the number and quality of the pieces of glass.

The finishing of the shade is done by covering the solder with copper, brass, silver or gold by electroplating. Before plating the shade with silver or gold, it should be plated with copper or brass. The plating is done in baths of the ordinary composition and offers no particular difficulty. Most shades are copper-plated and then coated with a beautiful dark green patina, which shows off to best advantage with these articles, and harmonizes best with the glass. After plating and oxidizing, the shades are coated with wax or shellac to protect them against atmospheric influences.

GOVERNMENT SPECIFICATIONS FOR MANGANESE BRONZE.

DISCUSSION OF A RECENT CRITICISM ON THE STANDARD SPECIFICATION.

In the January issue of THE METAL INDUSTRY for the current year there was published an article by Jesse L. Jones, an expert in the manufacture of manganese bronze, calling attention to various shortcomings or defects in the specifications now in use by the United States Government for this class of material. The attention of the Government was called to the article and evolved the answer printed below. Mr. Jones' reply follows and the matter should prove very interesting to any one engaged in the manufacture or use of manganese bronze.

To the Editor of THE METAL INDUSTRY:

Referring further to your letter of the 29th ultimo, transmitting a copy of your January issue containing an article by Mr. Jesse L. Jones, entitled "Government Specifications for Manganese Bronze," the commandant and superintendent of the Naval Gun Factory, Rear-Admiral E. H. C. Leutze, U. S. Navy, and the Chief of Bureau of Ordnance, J. C. Mason, have submitted the following report, which is quoted in full for your information:

"Two specifications for manganese bronze are quoted in this article. The first on page one, is, with certain additions, the standard specifications of the Naval Gun Factory, which has been adopted by the Bureau of Ordnance as its standard. The second, on page 3, is a special specification for bronze forgings for the Torpedo Station, in the preparation of which the Naval Gun Factory had no part. It should be noted, however, that this specification has been misquoted by the writer. The elastic limit was specified as 22 tons, not 35 tons as stated. The last named figure was specified for the tensile strength. Referring to the standard specification, this article finds objection (1) to the factors given for elongation and contraction, (2) to the requirement as to elastic limit, (3) to the specification covering the chemical composition.

"The requirements as to elongation and contraction are not unreasonable, as is proven by the fact that no difficulty has been experienced in obtaining metal meeting these specifications. The requirement as to elongation is admitted by the writer to be reasonable. The requirement as to contraction is also found on examination of our test records to be reasonable. There seems to be no apparent reason for changing it. The elastic limit is the vital characteristic for ordnance use, and cannot be omitted from the specifications. Any metal that showed such a wide variation as that quoted by this magazine writer would be unfit for our purposes. It is doubtful if the method described by said writer for obtaining the elastic limit is in practical use in any commercial establishment. The method of handling specimens may be added to the specifications, and it is recommended that this be done in the form of a note as follows:

"'Test pieces may be taken from any portion of the ingot. They will receive no special treatment except machining and will be pulled in a standard machine. Speed of pulling head one inch in three minutes. The elastic limit to be the "yield point," measured by the drop of the bar. Two specimens, taken from different portions of the same ingot, both falling below specification requirements, or any single specimen falling more than 5 per cent. below specification requirements, shall cause the rejection of that heat.'

"The chemical characteristics of the metal are important for our use from the fact that we use it not only for castings, but for forgings also. The proportions specified are those found by experience to be best suited for our purposes. The manufacturer is not bound by these specifications absolutely—'provided such differences are clearly noted and described by the bidder, and provided further that the bronze offered under these conditions is found to fully and equally well cover the specific requirements of the Government.' The percentage of aluminum is not specified, but its presence is not prohibited. The proportions which may be used is left to the discretion of the manufacturer under the clause above quoted. The presence of lead in any considerable quantity would, as the writer states, be very objectionable for our use, but it is very doubtful if a metal containing it would meet the physical test. It may very properly be prohibited, and it is recommended that the standard specifications be revised to permit the presence of not more than one-tenth of one per cent. of lead.

"The Naval Gun Factory has not experienced difficulty in obtaining satisfactory manganese bronze under this specification. At the same time it is always willing to accept intelligent criticism by manufacturers and other experts, if such criticism is found to be justified and revise its specifications accordingly. Such criticism should, however, be specific in character and based on facts that can be demonstrated.

"In accord with the foregoing the Bureau has proposed the following tentative specifications for manganese bronze to the Bureau of Ordnance, with a view to adopting it, with such modifications as may be advisable. If this specification is adopted it is intended that all purchases of manganese bronze for the Naval Gun Factory will be made in accord therewith:

"SPECIFICATIONS FOR MANGANESE BRONZE, FOR NAVAL GUN FACTORY,

"Issued by the Navy Department, ———, 1909.

"Manganese bronze for use in the Naval Gun Factory to be of an acceptable brand, such as 'Parson's,' 'Ajax' or 'Reeve's.'

"The above bronze to pass satisfactorily a practical foundry test in making castings, forgings, etc.

PHYSICAL PROPERTIES.

"The minimum physical properties required of a specimen 2 ins. long between measuring points and ½ in. in diameter must be as follows:

"Tensile strength, 65,000 lbs. per sq. in.; elastic limit, 30,000 lbs. per sq. in.; elongation, 15 per cent.; contraction, 25 per cent.

"The method of handling specimens will be as follows: Test pieces to be taken from any portion of the ingot. They will receive no special treatment except machining and will be pulled in a standard machine; speed of pulling head 1 in. in three minutes. The elastic limit to be the 'yield point,' measured by the drop of the bar. Two specimens, taken from different portions of the same ingot, both falling below specification requirements, or any single specimen falling more than 5 per cent. below specification requirements, shall cause the rejection of that heat.

CHEMICAL PROPERTIES.

"Manganese bronze must contain the following approximate percentages of the material specified below:

"Copper, 52 per cent.; iron, 1 per cent.; zinc, 46 per cent.; tin, 1 per cent; manganese, sufficient to make proper mixture.

"No scrap is to be used in making this bronze.

"Bids on manganese bronze differing slightly from the foregoing details will be considered, provided such differences are clearly noted and described by the bidder, and provided further that the bronze offered under these conditions is found to cover fully and equally well the requirements of the Naval Gun Factory.

"E. B. ROGERS,
"Paymaster General, U. S. N.

"Navy Department,
"Bureau of Supplies and Accounts,
"Washington, D. C., February 18, 1909."

Editor of THE METAL INDUSTRY:

Referring to the comments of Rear-Admiral E. H. C. Leutze, U. S. Navy, Commandant and Superintendent of the Naval Gun Factory, on the article entitled "Government Specifications for Manganese Bronze," published in the January, 1909, number of THE METAL INDUSTRY, the points made by him are mostly well taken.

The writer did unintentionally misquote the elastic limit given in the specifications for bronze forgings for the Torpedo Station, giving it as 35 tons instead of 22 tons. Still his conclusions are sound. Fig. 4 of the article in question shows the elastic limit of ordinary forging manganese bronze such as the Government buys to be about 25,000 lbs., which is very much below the required 22 tons, especially if these tons are long tons of 2,240 lbs. The method of taking the elastic limit by means of an accurate extensometer, while not rapid enough for ordinary commercial work, is in use in many industrial establishments where parts are designed that are under high stresses. The work of the Naval Gun Factory may not be so exacting as to require an accurate elastic limit curve sheet of the various grades of alloys and steel used in construction, but such curves are considered requisite in a number of commercial establishments and their engineers would refuse to use in the design of any important machine, an elastic limit which was the "yield point" measured by the drop of the bar. Data obtained by this method is very unreliable for brass and bronze, being nearly always too high and hence liable to lead to serious accidents if the material is worked up to its supposed elastic limit.

The presence of any aluminum whatever in a forging manganese bronze, is objectionable. Makers of valves and fittings are well aware that even a trace of aluminum in their metal will make the castings leak, because the aluminum becomes partly oxidized and diffused through the metal rendering it unsound, a condition that is to be avoided above all others in a forging metal.

The specification for manganese bronze outlined by Rear-Admiral Leutze will doubtless not be considered unreasonable by the makers of ingot. The "yield point" clause, while it throws a lot of responsibility on the testing machine and its operator, will probably detect any poorly alloyed metal, while for the use of the designing engineer the more accurate curve elastic limit could, if desired, be taken.

If each heat of ingot metal is tested it is desirable to have the heats as large as possible so as to reduce the number of tests. It is a question whether many manufacturers could make more than 3,000 or possibly 5,000 lbs. of manganese bronze ingots in a single heat, while some of them are content with making only 324¾ lbs. for a heat. JESSE L. JONES.

Oakmont, Pennsylvania, March 1, 1909.

THE METAL INDUSTRY has published valuable information from time to time relating to the manufacture and application of manganese bronze. Among the more important articles collected and written specially for THE METAL INDUSTRY were those published in Vol 1, 1903, pages 1, 8, 36, 81, 103, 128, 131; Vol. 11, 1904, pages 73, 78, 168; Vol. 3, 1905, pages 33, 139; Vol. 4, 1906, pages 31, 116, 289, and Vol. 6, 1908, page 348, besides numerous answers to questions relating to the more practical side of the production of manganese and copper alloys.

PLATERS' WRINKLES.

By C. H. PROCTOR.

(Continued from February number.)

SILVER PLATING BATHS.

When preparing a new silver bath be careful not to add too much free cyanide to the bath. It is better to have a little of the silver salt undissolved in the bottom of the tank than an excess of cyanide. New baths are sometimes very erratic. A little water of ammonia added to a new bath helps to age the solution, and a little ammonia added when the anodes have a tendency to turn dark or black will be found of value. If too much cyanide has been added to the bath at any time, add a little nitrate of silver, one-quarter ounce to a gallon. This will be found better practice than trying to take up the free cyanide with chloride or cyanide of silver. Potassium nitrate is formed, but this does not harm the bath unless an excess is added.

For bright silver baths, benzole will be found a good substitute for bisulphide of carbon; it stays up in the solution better. Dissolve in strong cyanide solution in the regular manner, and add about a teaspoonful to every ten gallons of solution. Do not confound benzole with benzine, as this is a different product, resembling bisulphide of carbon, but not so dense.

French gray finishes are still in vogue. For a good imitation without using any silver in the solution proceed as follows: Take some of the regular nickel solution and add all the common salt it will take up. Dead dip the brass articles and copper plate them in the acid copper bath for a few minutes; then polish or burnish the high lights; place in the salt nickel bath for three to five minutes. Wash and dry out in the usual manner. A finish equal to many regular silver grays will result.

(To be continued.)

TRANSPARENT METALS—NEW INTERESTING EXPERIMENTS WITH SILVER.

By J. Horton.

It is well known that metals under ordinary conditions are opaque, not only to light, but also to the Roentgen rays. Up to the present time the only case of transparency known is that of gold, which, when beaten into sheets of one three-hundred-thousandth of an inch in thickness transmits a characteristic green tint. About 50 years ago Farraday showed to the Royal Society that thin sheets of gold and silver, when heated in glass plates, became transparent.

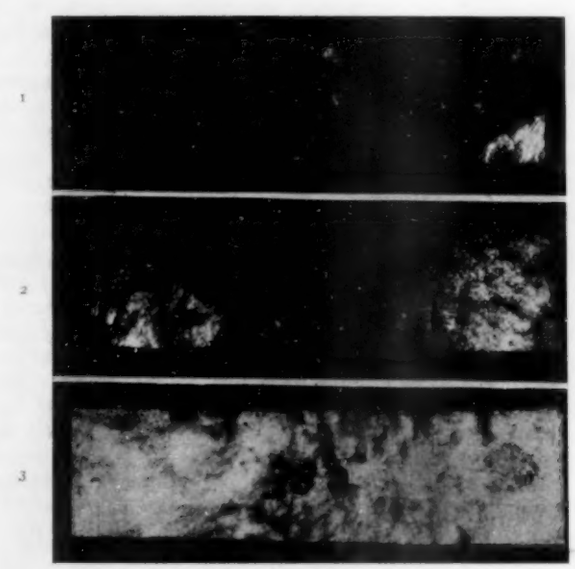
Until very recently no experiments had been made along this line when Professor Turner took up the question and has shown that in the case of silver, the glass plates become as transparent when covered with silver leaf about one hundred-thousandth of an inch in thickness as when no matter is present. He has shown that this action commences at a heat of 240 deg. Centigrade, and only occurs in the presence of air or oxygen. It does not take place if the silver is heated in a vacuum or in hydrogen. Curiously enough silver does not become any heavier; nor does the oxygen alter in bulk so that at first sight it may appear difficult to account for oxygen being necessary. But it is suggested that there is a temporary combination of the oxygen with the silver, which is afterwards broken up. It is easy to show that the silver, though transparent, is still there. Perhaps the easiest way is to write on the glass with an agate style and it will be found that the characters are clearly outlined in bright silver.

A new observation in connection with these experiments has been that thin leaves of copper become quite transparent when heated in air and transmit light of various shades of green, according to the degree of heat used.

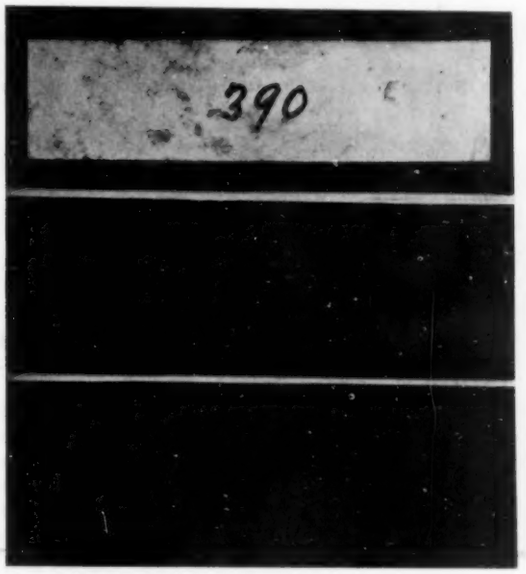
With regard to thickness of the metal, Professor Turner has shown, in the case of silver, that metal one ten-thousandth of an inch in thickness or upwards does not become transparent when heated, and assuming that the action goes on from both sides of the sheet at once, the thickness actually operated upon is apparently one four-millionths of an inch.

Referring to the cuts, they represent sheets of silver placed upon glass and heated to the temperature and in the atmosphere as indicated.

Copper is not affected if heated in coal gas, or away from oxygen. But when a very small quantity of oxygen has been absorbed by the copper, the metal transmits a beautiful emerald green light, and this becomes darker and darker as more and more oxygen is absorbed until at last the familiar black cloud is produced. The transparent material obtained still contains metallic copper, and if it is treated with a dilute acid a brilliant film of metallic copper is left behind. The peculiarity of copper in this state is that it is quite transparent, and allows white light to pass through, and if examined under a microscope it is seen to be uniform in texture and translucent. Other metals have been examined such as aluminum and Dutch metal, and these do not become transparent when heated in air to any observed temperature.



1. SILVER HEATED IN AIR TO 240° C.
2. " " " " " 260° C.
3. " " " " " 335° C.



4. SILVER HEATED IN AIR TO 390° C.
5. SILVER HEATED IN COAL GAS TO 375° C.
6. " " " " " 500° C.

EFFECT OF NICKEL ON FOOD.

Nickel having come into extensive use in the kitchen, it is important to know what action food substances have on it, and how its compounds may affect a person eating food containing them. Late Russian experiments are reassuring on both points. Substances boiled in nickel vessels took up a small amount of the metal—from 0.0002 with some foods to as much as 2 per cent. when the acid present is excessive; but a solution containing 4 per cent. of citric acid and 5 per cent. of common salt, had only 0.144 per cent. of nickel after boiling three hours in a nickel vessel and then standing eleven hours in the same vessel. The physiological effects of nickel salts were slight, while there was no tendency to accumulate in the body after repeated doses. Nickel in quantities up to a quarter of a gram daily, in the form of lactate or butyrate, was given to two dogs for 202 days, with no result, and a dog that died after taking 9.7 grains, (about a third of an ounce), in forty days had no nickel in its body, its death having been due to some other cause.

COPPER ROLLING MILL PRACTICE.

A SERIES OF ARTICLES ON THE SUBJECT.

By Copperman.

(Continued from February number.)

AUTOMATIC PINCH ADJUSTER.

No possible means could be provided to do it as quickly, or with any more certainty. Whenever the copper people get interested enough in the efficiency of their machinery and processes to look after all small delays on their rolls that tend to decrease the possible maximum production then this sort of a device will be but one of many that may be worked out and applied to secure better results in higher tonnage. In no other way than keeping the rolls supplied with metal, and the metal actually in the rolls the greatest possible per cent. of the total time, can the steel plate mills turn out the tonnage that they do. Copper mill superintendents have, in the past, never thought it possible to get anything like the production out of their mills that their steel neighbors have, but I contend that a closer study of the machinery and methods of the latter cannot but show them where they may increase their output, if they but break away from old methods, and are not afraid to try something that is new to them even though their men say it cannot be done. Simply make up their minds to do it, and if the men they have won't try it, or do not give their idea a fair show, get competent help that will.

For breaking down cake copper up to 250 lbs. in weight, a satisfactory back table is the old fashioned one now used so extensively. It is of cast iron, with a brass strip on the front end where it rests on the bottom roll, setting on lugs cast on the housings with a taper shoe underneath the table to tilt it to an angle of about 18 deg., and provided with a roller in the back end just at the edge of the housings. With this kind of table two good catchers behind can put the cake over to the roller as quickly as any man on the screw can get the top roll down for the next pass. When it comes to handling a cake of over 350 lbs., this table is not satisfactory, although they get around the trouble by putting extra men on behind, a 600 lb. cake being all four or even six men can get over for the first three or four passes. When a mill is to break down cake from 200 to 750 lbs., it is well to do away with the old table entirely, put a plain bar behind and use four heavy plate steel guides about 8 inches wide, set perfectly level, and put a roller in bracket bearings on the outside of the housings, then swing from a cross I beam trolley above, a chain and hook-up bar. Two men can handle up to 300 lb. cake as fast as the old way, and three men, one catcher and two hook-ups can handle 500 lbs. On 750 lb. cake four men, two catchers and two hook-ups can easily put them over, and do it neatly and quickly. However, on a mill to roll large square or octagon cake, these means for getting the cake over become insufficient, and builders resort to hoisting tables. Of these, the simplest is a table made of steel strips flat wise (with little rollers in between), properly braced and guided, and raised vertically by means of a steam or air cylinder underneath the table in a pit or overhead in the roof truss. When the table has been raised to the level of the top roll, the cake is pushed over by hand, requiring three men behind, one as operator, and two catchers. There are in use two or more tables which not only raise the cake on the back side, but also return it over to the front side. One does so by means of driven rollers in the table, they engaging at the proper point and returning the cake. The other accomplishes the same thing by tilting up on the back end, and the cake goes over to the roller by gravity. This latter table is built for heavy cake, and one man, the operator, can return a cake of any weight up to two tons, while on ordinary cake he drags out on the last pass and returns in time to operate the table for the next cake. For a plant running a large sheet mill where a few heavy cakes of say 600 to 2,500 lbs. have to be broken down each day, this sort of a table would save much in labor, and not hold the rolls back on regular cake.

One thing new in connection with breaking down rolls is the installation in a lately built plant of a universal mill, with 24x72 inch horizontal, and 14 inch vertical rolls, so built that the vertical attachment can be removed in a few minutes by means of an electric crane. This mill has many good points, being built with a lifting table operated by two air cylinders on the back side of the housings, thus leaving the space under the table clear of any cylinder or piston rod. The universal idea is new to the copper mill, and has many uses, for instance: rolling anodes to width, saving labor and scrap on shearing; rolling to width heavy bars to be cold rolled; and the rolling from different width slabs of the stock for strip or roll copper, from 8 inches up, allowing about 3-16 inch side scrap to spread to ⅜ to 7-16 inch in cold rolling. The advantages of the latter are, the saving of unnecessary scrap and slitting labor, and good edges will be obtained that will stand heavy cold rolling without cracking, which trouble often comes from cold rolling unannealed strips with sheared or slit edges.

In addition to the universal mill just mentioned, there is still another newer installation of a 3 high 22x42 inch mill, used for breaking down cake and also for roughing pieces, electrically driven and equipped front and back with hoisting tables. For breaking down purposes, this mill is limited to about 38 inches in width, which is suitable for cornice copper up to 36 inches finished size. On heavy cake, 2,000 lbs., for instance, the maximum size to which it can be broken down is, say, 38x123 inches by 1⅜ inches thick, for cross rolling to finish 120 inches wide, while on a 60 or 64 inch roll the same cake could be broken down to say 56x123 inches, by 15-16 inch thick, thus relieving the finishing mill of that much work. As a roughing mill for pieces, I doubt if it is any faster or as fast as a plain two high mill. Again the labor must be higher, due to necessary labor to operate the tables, and a higher priced man behind as a return sticker, whereas on a two high mill the same work can be done by three men, only one of whom draws high wages. The mill, including pinions and tables, must cost at least 75 per cent. more than a two high, judging from weight of iron alone, and I question the result as compared to the heavy first cost.

Before taking up the other classes of mills, mention may be made of an installation for rapid and cheap production of certain classes of sheet copper, which, while in use by the steel people, has not yet been tried by the copper mills. There are large quantities of sheet copper made that range in width from 12 inches up to 40 inches, and in gauge from No. 12 Stubs down to sheets as heavy as No. 2, that can be rolled from the cake to finish in one heat. The sizes referred to include 30x60 inches No. 12 and heavier, and narrow sheets for pipe work that can be rolled in multiple widths, and multiple lengths also if necessary, from cakes of various weights. It requires two pair of rolls to do this, in order to have a good finish on the sheet.

One concern makes it their business to get such orders and hold them for a day's run. Extra men are

put in the breaking down and finishing crews, and the cakes rushed from the breaking down rolls at the proper width and thickness to a 24 inch mill, where they are finished to gauge while the next cake is being broken down. A production of about 25,000 lbs. shipped weight has been made from these two pair of rolls in 10 hours with one furnace and a crew total of 16 to 18 men. The installation for such work would consist of a three high, 22 or 24 inch x 48 inch finishing mill, to work in connection with a 22 or 24 inch breaking down mill of the ordinary type, and have two furnaces to feed the breaking down rolls Finishing mill to have tilting tables with driven rollers, and top roll fitted with electric screw down. I say that these two mills, so equipped, could turn out 35,000 lbs. of finished sheet in 10 hours, with a labor cost of heating and rolling of $27,00, and a total labor cost, including scaling, shearing and shipping, of less than $125.00, provided the plant have some modern facilities for handling the product from the rolls.

SLABBING, ROUGHING AND FINISHING.

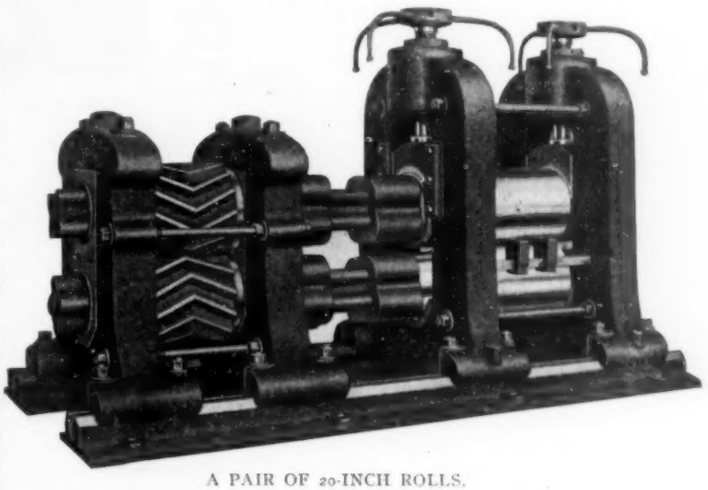
I shall speak of these classes of rolls under one head, as any pair of finishing roll can be used for slabbing down. This process, slabbing, consists of rolling a reheated cake or half cake of ¼ inch, up to 39 inches wide, down to a gauge of about .070 on a 20 or 22 inch x 60 inch mill. From this sheet the prices are cut for packs and sent to the finishing rolls. For finishing the smallest roll used is a 20x44 inch, of which there are several in the different mills, and it makes a suitable mill for widths up to 33 inches, and even for 39 inches, if the roller knows how to put them in shape. However, 20 and 22 inch mills, 60 and 64 inches long, are more commonly used for 39 inch packs, and a good roller can roll 51 inches on the same sized roll, although such work is usually done on a 22 or 24x84 inch. I know of instances where a finished width of 60 inches has been rolled on a 64 inch roll, and 81 inches on a 84 inch roll, but these were cases where there were no other possible means by which the required width could be rolled. Finishing mills are with counterweighted top rolls, except a very few which are friction, but no one makes much of a success with the latter unless he has some idea of how the same style mill is handled on sheet steel or tin plate.

HEAVY SHEET MILLS.

There are but few mills of this class, and roll sizes range in diameter from 28 to 34 inches, and lengths from 128 to 144 inches. They are used for finishing all heavy braziers sheets and circles, such as are used mostly for making heavy tanks, kettles, etc., and also for finishing wide yellow metal sheets, of which quite a good many are rolled. Mills are fed by a deep, wide furnace, usually burning crude oil, where the heavy cakes, broken down as before described, are reheated as many times as it may be necessary. The mills used for this class of work must necessarily be equipped front and back with hoisting tables, built with free turning rollers in them so that the sheet will be easy to handle.

The furnace should be directly in front of the rolls, with tables between it and the mill table, so that the sheet can be shoved into the rolls as quickly as possible, as the first three or four passes on a wide sheet that is getting down thin are the ones that give the elongation. Usually it takes too much time to get the sheet back over the rolls, and its heat is soon lost. The result is that the sum of the times the sheet is in the rolls, compared with the time from leaving the furnace until ready to return to the furnace, will probably not be over 15 per cent. of the total.

In regard to the speed of rolls, which has been discussed only in a general way, it will be found that practice varies. For instance, there are breaking down, slabbing and finishing rolls of 20 and 22 inch diameter used at all speeds from 28 to 45 R. P. M., equivalent to a surface speed of 150 to 235 feet per minute. A very satisfactory speed for finishing hot packs is for 20 inch rolls at 35 to 38 R. P. M., with other diameters in the proper ratio, 24 inch at about 30 R. P. M., all of which give a surface speed of 190 to 200 feet per minute. When it comes to the large mills for hot sheet, the best results will be obtained by keeping the surface speed down to the same figure, although some of them are run at over 300 feet per minute. At this speed the shock from entering is great, and the result is light draft and extra passes, to prevent breakage. This seems in strange contrast to the practice on large mills for steel plate, of which I will mention a 34x128 inch, and a 38x140 inch, both at 85 R. P. M., and a 36x134 inch at 60 R. P. M., giving surface speeds of 750, 850 and 565 feet per minute respectively. However, it must be borne in mind that all these mills for steel plates are three high, driven by engines of from 2,000



A PAIR OF 20-INCH ROLLS.

to 3,000 h. p., with heavy fly-wheels, and also remember that on a three high mill the front end of a sheet on the odd passes becomes the back end on the even passes, and consequently both ends tail out and taper off in gauge so that the shock on entering either way is nothing like the shock that comes on a two high mill from entering the almost square end of the plate always the same way. Again, the construction of these mills is much heavier in necks, housings, spindles and boxes than on a copper mill with practically the same sized rolls. As an illustration of a skillful job of rolling on a large mill, I mention the finishing of a circle 128 inches in diameter, 4¼ lbs. to the square foot in 132 inches square from a cut-to-weight plate about ½ inch thick on a 33x144 inch mill in 2½ hours.

(To be Continued.)

Though gold and silver were discovered before copper, yet copper seems to have been the first metal which became of real importance to man, probably on account of its wide occurrence and the ease with which its ores are smelted. Tin also attracted early notice on account of the great heaviness of its ores. When metals were scarce it would sometimes happen, naturally, that some tin would be added to copper, or vice versa, and it would then be found that the properties of the alloy were quite different from the original metal. No relics of tin have been found alone and very few of copper. The few exceptions possibly indicate temporary lack of either metal.

SILVER PLATING.

AN INSTRUCTIVE DESCRIPTION OF THE PROCESS.

BY OSCAR A. HILLMAN.

OSCAR A. HILLMAN.

As the present low price of silver has caused an unprecedented demand for sterling and silver plated articles of almost every description, a large number of platers who have had only limited experience in that line of work are installing silver solutions and are finding that it is comparatively easy to deposit a coat of silver on any metal, but to produce a good, smooth deposit that shall have a guaranteed weight is one of the most exacting branches of plating.

The object of this article is to point out the usual sources of trouble and the way experience has taught to overcome or avoid them. The first point to take into consideration is the available electro-motive force, for unless a current can be obtained that will be adapted to the work it will be a waste of time and money to install the solutions. Pure silver conducts electricity better than any other metal, and as a good solution should be very rich in metal, a current of not more than 3 volts intensity should be used or the work will burn while plating. As the number of amperes used determines the rate of deposit, it is an advantage to use at least twelve amperes per square foot of cathode surface.

Although all platers know the necessity of having a surface free from all traces of dirt or oxidation, the most common source of trouble in silver plating is imperfectly or carelessly cleaned work, or work that has been bright dipped and afterwards exposed to the fumes from acids and become tarnished. All work that has been polished before plating should be washed in a strong soap and ammonia wash, rinsed off, dipped in a hot potash dip, rinsed off, dipped in a cyanide of mercury solution containing 12 dwt. cyanide of mercury and 4 oz. cyanide potassium per gallon, rinsed off and struck in the silver strike, then immediately put in the plating tank and left until the desired deposit has been obtained.

SATIN AND OXIDIZED FINISH.

Brass, copper or german silver articles that are to be satin finished or oxidized should be dipped until bright, then satined, after which they are strung up and dipped in a bright dip composed of:

2 parts nitric acid;
1 part sulphuric acid;
12 oz. hydrochloric acid per gallon;

rinsed off and dipped in a solution containing per gallon:

Nitric acid ..... 4 oz.
Mercury ..... 4 dwt.

After receiving a light film of mercury the work should be struck and plated as usual.

If the work to be plated consists of iron or steel as cutlery, manicure sets, scissors, etc., it will be necessary to have the articles polished smooth, then washed off in a strong soap and water solution, afterwards dip in a very dilute pickel of hydrochloric acid and water, then strike at once in the silver strike and if a good clean deposit is obtained, place in the silver tank. If any spots or streaks remain on the work after being struck, give it a good scratch brushing, wash in the soap wash and dip in potash, strike again, and put in the plating tank.

THE SILVER STRIKE.

The strike solution should be made by dissolving pure silver in nitric acid and precipitating with cyanide of potassium, dissolved in water, until all the silver is thrown down, care being taken not to use too much cyanide which will dissolve the silver again, causing a loss of metal. For each ounce of silver converted into cyanide of silver, dissolve five ounces of cyanide potassium and one-half ounce of caustic soda in a gallon of water, add the silver which should make the solution a light amber color when it is ready to use.

The reason for using a large amount of free cyanide in the strike is to remove all traces of oxidation, while the caustic soda attacks all oil, crocus, etc., and leaves the work chemically clean, while the thin coat of silver the work receives when in the strike protects it while transferring it to the tank.

THE TANK SOLUTION.

The tank solution in which the work receives a heavy deposit should contain three ounces of silver (converted into cyanide), six ounces cyanide when the solution is first made, after working about two weeks, add an ounce of cyanide per gallon. The tank should be deep enough to allow the work to be suspended in the solution without touching the bottom and wide enough for two anode and one cathode rods. When the plating solution is working right, the work should have a smooth, dead white color after plating and the anodes should have a gray color while working, changing to white when idle.

If the anodes turn green while working, they contain copper and should be refined or discarded for pure silver ones, or if the anodes turn black it shows a lack of free cyanide or that the solution was made with chloride of silver and contains a large amount of chloride of potassium and needs more cyanide; as good results cannot be obtained for any length of time from a solution that turns the anodes dark. All work that is to be polished after plating should be lightly scratch brushed and washed off, dried and polished.

Work to be "oxidized" should be dipped in hot water, then dipped in a strong solution of sulphurated potassium until bluish black, and if wanted as oxidized silver, dry scratch brushed, bright relieved on the high lights on a cotton wheel with fine pumice stone.

For a French gray finish, take the work as soon as blackened and scratch brush with a brass wire wheel with fine pumice, polish or burnish high lights. Butler finish is produced by scratch brushing the work after plating, wash and dry, then paint with chloride of platinum, afterwards rubbing off with pumice and burnishing.

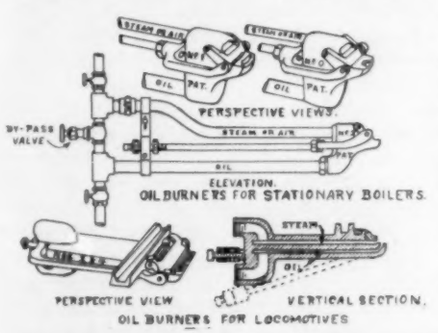
One of the most important regions for copper, in spite of its unfavorable location, is the source of the Tigris River, in Asia Minor, where the celebrated mines of Arghana Maden are located. The ore mined here contains from 13 to 14 per cent. copper. At the mines the ore is only cleansed before being transported on camels to Tocat, a distance of six days' journey, but there is a probability that these mines have been recently closed.

THE PRODUCTION OF AND THE DEMAND FOR LIQUID FUEL,

COMMONLY KNOWN AS CRUDE OIL AND TAR IN THE UNITED STATES.

BY W. N. BEST.

Some years ago the United States Government recognized the value of this new fuel and appointed a competent board of experienced engineers to test and report upon it. A series of tests were made under the direction of Rear Admiral George W. Melville, engineer-in-chief, United States Navy, and in 1904 this board brought forth the most exhaustive report on fuel ever published. It has attracted the attention of the world to such an extent that oil-producing lands are now being sought by every nation of any importance. Possibly thousands of burners for atomizing liquid fuel have been patented, but they all involve practically the same principle—that is, the oil and steam or air used through the burner usually pass from the nozzle of the burner in the same direction; and with this type of burner, great difficulty is often experienced on account of the burner carbonizing. The accompanying cut shows a modern hydrocarbon burner, the construction of which is foreign to all others. The oil cavity is below the steam or air orifice, and as the fuel passes outwardly out of the orifice, it is struck by the atomizer as the steam or air horizontally issues forth. This peculiar construction insures any grade of liquid fuel, either oil or tar, being so thoroughly atomized that a mist or vapor is formed, and furthermore, it prevents the burner from carbonizing. It also causes the even distribution of the heat in the form of either a long straight flame or a broad fan-shaped blaze according as the burner may be filed in order to meet the requirements of the service in which the burner is being used. Should any scale or other foreign substance get into the atomizer slot, by slackening the set screw in the bridle, the lip of the burner can be raised and the obstacle blown out by the force of the atomizer. In the plate-heating furnaces used in boiler shops or in sheet copper furnaces used in copper rolling mills, which are often twelve feet wide by twelve or fifteen feet long, only one burner is used and yet the heat is at all times evenly distributed in these furnaces.



It may be of interest to note the chemical analysis and heating properties of the various grades of liquid fuel, which are as follows:

Beaumont Crude Oil—

Carbon	84.60%
Hydrogen	10.60%
Sulphur	1.63%
Oxygen	2.87%
Calorific volume per lb	19,060 B. t. u.
Gravity at 60 F	21° Baume
Weight per gallon	7½ lbs.
Calorific volume per gallon	142,950 B. t. u.

California Crude Oil—

Carbon	81.52%
Hydrogen	11.01%
Sulphur	.55%
Oxygen and Nitrogen	6.92%
Calorific volume per lb	19,500 B. t. u.
Weight per gallon	7.6 lbs.
Calorific volume per gallon	148,200 B. t. u.
Gravity varies from	12-36° Baume

Risidium oil, obtained from refineries and commonly called "Fuel Oil"—

Carbon	84.35%
Hydrogen	11.33%
Sulphur	.90%
Nitrogen	.60%
Oxygen	2.82%
Calorific volume per lb	19,000 B. t. u.
Weight per gallon	7.5 lbs.
Calorific volume per gallon	142,500 B. t. u.
Gravity varies from	26-28° Baume

Coal tar and water gas tar are both excellent fuels when thoroughly atomized, and while their calorific value per pound is less than crude oil, on account of their weight per gallon being much greater, they contain more British thermal units per gallon than does oil. In 1905 there was produced in the various coal gas works and bi-product coke ovens in the United States 80,022,043 gallons of tar while that produced at the water gas plants in that year amounted to 9,230,411 gallons, making a total of 89,252,454 gallons of tar aside from the amount burned under coke oven benches and boilers in these plants. The tar produced from coal gas works in 1907 amounted to 49,581,965 gallons, from bi-product coke plants 53,995,795 gallons and from water gas plants 14,414,017 gallons, making a total of 117,991,777 gallons, aside from that consumed in the plants during that year of which no record was kept. Coal tar weighs 10 lbs. per gallon and contains 16,260 B. t. u. per lb., or 162,600 B. t. u. per gallon, while oil tar weighs 9½ lbs. per gallon, contains 16,970 B. t. u. per lb., or 161,200 B. t. u. per gallon. The following is the analysis of coal tar made from Dominion coal and of London tar:

	Dominion	London
Carbon	81.50%	77.53%
Hydrogen	5.68%	6.33%
Nitrogen	———	1.03%
Oxygen	12.45%	14.50%
Sulphur	.37%	.61%

It can readily be seen that liquid fuel is an important factor as a fuel today and I believe that it will steadily recommend itself and more and more engage the attention of the manufacturing world as the years go by.

Let us for a moment consider the production of liquid fuel from its humble beginning to the present date. In 1859 only 2,000 barrels were produced in the United States, and up to the year 1901 its development was very slow for in all those forty-two years only 1,007,135,138 barrels were produced; while in the year 1901 69,389,194 barrels were produced; in 1902, 88,733,916 barrels; in 1903, 100,461,337 barrels; in 1904, 117,080,960 barrels and in 1905 134,717,580 barrels were produced. In 1906 some of the Texas fields began to decline and so only 126,493,936 barrels were produced, but during that year many new fields were located, for as the development of new machinery, steel, etc., has progressed there has become a greater demand for the new fuel. In 1907 the production in the United States amounted to 166,095,335 barrels, which, if placed in a gigantic reservoir, would make a lake one mile wide, three and one-third miles long and ten feet deep.

MINING ENGINEERS VISIT NAUGATUCK VALLEY ROLLING MILLS AND METAL PLANTS.

SOME OF THE NEW AND NOVEL DEVICES IN THE VARIOUS WORKS.

BY L. J. KROM.

The American Institute of Mining Engineers held its 96th meeting at New Haven, Conn., during the week beginning February 23. The sessions were held at North Sheffield Hall of Yale University, the first three days of the meeting being taken up by the reading and discussion of papers on mining subjects and lectures by prominent members of the Institute.

Friday, February 26, was excursion day and 100 members of the Institute, boarding special trolley cars, were whisked through the picturesque scenery of southern New England to Ansonia, a busy, bustling hamlet famous for its production of copper, brass and iron manufactures.

The large plant of the Ansonia branch of the Coe Brass Manufacturing Company, of Torrington, Conn., one of the largest units of the American Brass Company, was first visited. Here the engineers were somewhat surprised to find practically the whole plant in active operation, and the operatives seemingly oblivious of the fact that sluggish trade conditions existed in other localities.

Passing through the many departments of the works the visitor was struck with the rhythmical symmetry of production of the finished product from raw material. The principal output of this plant is copper in wire and sheet form with some brass and German silver wire. Starting with a copper bar 4 inches square and 4 to 5 ft. long, weighing from 150 to 300 lbs., the various operations are performed with surprising uniformity until the ungainly red mass of metal is finally reduced to a shining coil of wire only .003 inch in diameter—really smaller than a human hair.

The copper billet is heated to a cherry red in a furnace using oil for fuel under pressure. The red-hot billet is then rolled in a mill fitted with two chilled iron rolls. The rolls are grooved with grooves of large and small size. These grooves when the rolls are set close together form a die through which the billet is forced and is thus reduced in diameter and lengthened out. The rolling operation is all done while the metal is still hot and leaves the rolls at a size ¾ inch in diameter.

The next operation upon the wire or rod now in a coil, consists of heating in a muffle furnace to anneal or soften, and then pickling in a dilute solution of sulphuric acid and water contained in a lead-lined tank. This dissolves the scale and leaves the wire clean and bright. After passing through several wire drawing machines, being reduced in diameter and becoming longer and longer, the wire finally reaches the continuous wire drawing machine using ten dies. Here the wire enters at .08 of an inch or so and comes out at the other end .003 of an inch. The speed at which this wire was drawn through the machine making ten reductions, all in one operation, astonished the engineers, when they learned that it was traveling at the rate of 1,500 ft. per minute or 17 miles per hour.

Of course not all of the wire is finished at this size, larger sizes being produced on the way down. The process followed in the manufacture of brass and German silver wire differs from that for copper, in that the hot rolling at the start is replaced by a gradual reduction by rolling and drawing in the cold. These operations will be described more in detail in a future issue of THE METAL INDUSTRY, an article on the subject being in course of preparation.

At this plant is located the justly celebrated extrusion process machine, of which there are only two now being operated in this country. This machine consists of a hydraulic cylinder at one end and a huge mass of metal called the holder at the other. The holder comprises a hollow cavity to receive the metal to be extruded, and an attachment called the die-holder in which the die is placed. The metal used for extruding purposes is composed of a mixture of copper from 57 to 62 per cent. and zinc 34 to 41, with 2 to 4 per cent. of lead; sometimes a mixture containing a little tin is used, but the one in more common use is copper, 62; zinc, 35, and lead, 3 per cent.

Extrusion metal is cast in seamless ingot molds which produce a billet 18 to 20 ins. long, 6 ins. in diameter and weighs 180 to 190 lbs. The billet is heated to cherry red and put directly into the holder of the machine. The die is put in place (the holder and die having been previously heated), and the pressure turned on. The plunger or pusher of the hydraulic cylinder approaches the butt end of the billet, and entering the back end of the holder squeezes and compresses the billet until it is forced out through the die, having either one hole for large sizes or several for smaller rod.

The principal and most important application of extruded brass is for the making of complicated and intricate shapes not very readily and economically made in wrought or molded forms. The power required to operate an extrusion machine is considerable, the pressure necessary to extrude a billet being from 600 to 1,200 tons per square inch. The engineers were given to understand that extruded brass rod would not answer to take the place of regular brass drill rod for high speed service.

From the plant of the Coe Brass Manufacturing Company the party was conducted to the mills of the Ansonia Brass and Copper Company which adjoin. Here the principal matter of interest were the methods of handling the various productions of this plant. One process in particular was observed with great attention, the treatment of Tobin bronze, sometimes called naval rod mixture. This material is cast in iron split molds in ingots varying from 3 to 6 ins. square in section and 6 ft. and over long, weighing from 200 to 1,200 lbs.

The composition of this material is 61½ parts of copper, 37½ of zinc and 1 of tin, has a rich golden color, close grained texture and gives a tensile strength of upward of 79,000 lbs. per square inch, an elastic limit of 54,000 lbs. with an elongation of from 12 to 15 per cent. on a one inch bar. The ingot of Tobin bronze is heated in a muffle furnace to a cherry red and immediately rolled on three-high grooved rolls having six openings.

The first pass merely reduces the square section and produces a "breaking down" or condensing effect. The second pass changes the shape to a diamond section, the third to an eliptical, the fourth a true oval and the last two to a round. The three-inch square ingot in particular being reduced in the six passes to a rod 1⅝ ins. in diameter. For smaller sizes the rod then goes through the same processes applying to the regular brass rod, all the reductions being made in the cold. The principal sizes used of this mixture are 1½ ins., 1 in. and ⅞ in. in diameter with some ¾ in.; most of it, moreover, is used by the Government in naval construction, hence its name of naval rod.

Time and space will not permit of a detailed description of all of the ingenious and novel devices used at this plant to facilitate production. I can only mention in passing some of the more important which caught the visitor's eye, such as method of coiling the brass as it comes

through the rolls, a coiler with one belt, but arranged to get both forward and backward speeds to wind and unwind; a coiler attached directly to the rolls automatically catching the end of the coil of brass, rolling it up and then releasing when the rolling operation was finished. A clever device to put a rounded edge on a strip of copper for commutator winding. A method for taking care of surplus lubrication. A scheme for recovery of copper from pickle tubs and "scaling" pits. A fast moving machine for "scalping" rods.

From the last mentioned plant the party went to the Ansonia Farrel Foundry and Machine Company's works, where they were met by Senator Alton Farrel and other officials and shown through the various departments. The metals worked here are iron and steel, the firm making all kinds of heavy machinery used in the brass and copper trade and other industries. Here were seen in process of manufacture from the mold for the casting to the finished product; rolls for every conceivable purpose from the little roll, 3½ ins. in diameter by 18 ins. long, to the ponderous mass of metal in a roll 36 ins. in diameter by 160 ins. working face and weighing 60,000 lbs.

There were rolls for steel, rolls for copper, brass, lead, tin and zinc, rolls for gold and silver, rolls for leather, rubber and linoleum, rolls for paper and celluloid, and rolls for corrugated and special shapes of galvanized and tinned sheet iron. Here were seen all kinds of rubber mill machinery, calanders, mixers, grinders, presses and washers. Here were also stone crushers, lead presses, scrap metal compressors, alligator shears, and cinder grinders.

Of the ponderous class of machinery manufactured here should be mentioned the enormous sugar mill press, one now in course of construction being over 100 ft. long, 10 ft. high at one point, and costing $95,000 when completed.

Finishing the inspection of the above plant the engineers were carried to Bridgeport, 16 miles away, in their special cars, enlivening the trip by discussion of the interesting features of the factories they had seen. At Bridgeport a stop was made at the Stratfield, a luxurious hotel lately opened and conceded to be the finest and most complete hostelry between New York and Boston.

A luncheon was tendered the visiting engineers by the Bridgeport Board of Trade, a most progressive body of men interested in the industrial welfare of the City of Bridgeport. At the luncheon versatile Fred Enos, president of the Board of Trade, presided and at the close called on various prominent business men and engineers for remarks, Mayor Lee, of Bridgeport, and Horace Jackson speaking for the city and Vice-President W. L. Saunders and Earnest Howe responding for the Institute.

After luncheon the party was photographed on the steps of the County Court House and then viewed an exhibition of the locomobile chemical fire engine belonging to the Bridgeport Fire Department and manufactured by The Locomobile Company of America. The special trolley cars next conveyed the excursionists to the mammoth plant of the Crane Company, where a most interesting inspection was made of the automatic molding and casting system in operation at this plant, whereby the Crane Company are enabled to produce malleable iron pipe fittings at marvelously low prices.

The Locomobile Company of America was next visited, and here were shown the painstaking methods pursued in making an automobile, every part entering into its construction being given the minutest care and attention. Special steels are used which have been worked up to the highest degree of efficiency, and elaborate heat treatment is given in the hardening process. No machine is sent out from this factory until it has had the most rigid tests, and the officials are satisfied that it is up to the high standard set by its predecessor. The remarkable success of these cars both at home and abroad is a fitting testimonial to the thoroughness of their manufacture.

Among the members of the visiting section of the Institute were: Secretary, Dr. Joseph Struthers; Dr. A. R. Ledoux, of Ledoux and Company, New York; W. L. Saunders, president of Ingersoll Sargeant Rock Drill Company; Professor H. O. Hoffman, of Massachusetts Institute of Technology, Boston, Mass.; Professor Howard Eckfeld, of Lehigh University, South Bethlehem, Pennsylvania; W. R. Ingalls, R. V. Norris, Theodore Dwight, W. H. Crawford, Ernest Howe, J. G. George, N. V. Hansell, S. M. Pitman, C. W. Parker, L. D. Storrs, R. G. Leckie, A. S. Blackwell, of Burmah, India; S. Le Fevre, H. G. Granger, of Columbia; A. O. Granger, E. S. Hutchinson, G. A. Orrok, C. A. Matcham, Thomas Lynn, George Omrod, J. D. Omrod, H. G. Wagner, J. W. Miller, H. W. Dubois, C. B. Watson, H. D. Smith, N. Herz, D. D. Irwin, C. D. Thompson, A. London, J. D. Holm, E. W. Brown, and the following members of the New Haven committee: Senator Alton Farrel, J. D. Irving, F. L. Bigelow, A. H. Day, F. J. Kingsbury, Jr., J. K. Punderford, G. T. Surface, H. E. Gregory, L. D. Huntoon, J. W. Roe and Stuart Hotchkiss.

Each member was presented with a souvenir of Bridgeport and parted from the members of the reception committee of the Board of Trade with hearty expressions of appreciation.

THE AMERICAN BRASS COMPANY.

The American Brass Company, the largest manufacturers of brass in the world and which controls seven separate concerns, held their annual meeting at Waterbury, February 25th. They elected directors and officers and issued a financial statement. The following is the statement of January 1, 1909:

ASSETS.

Cash	$4,979.88	
Due from subsidiary companies	2,333,756.23	
Accounts receivable	19,078.79	
Birmingham Brass Co. Investment	168,161.83	
Capital stock with subsidiary companies	12,500,080.00	
		$15,026,056.73

LIABILITIES.

Capital stock	$15,000,000.00	
Surplus	26,056.73	
		15,026,056.73
Cash balance Jan. 1, 1908.	$60,664.04	
Dividends paid by subsidiary companies, 1908	928,698.61	
Account loans	200,000.00	1,189,362.65
Paid stockholders of American Brass Co.	787,500.00	
Deb'ture notes.	225,000.00	

Current expenditures, Am. Br. Co., interest on loans, etc....	171,882.77	1,184,382.77
Balance		4,979.88

SUBSIDIARY COMPANIES.

ASSETS.

Real estate, machinery, and tools, Jan. 1, 1908..	$8,953,147.48	
Expended for permanent improvements, 1908....	483,833.31	
	$9,436,980.79	
Less charged off for depreciation	400,000.00	
	$9,036,980.79	
Cash	1,002,238.99	
Accounts receivable.....	2,953,338.54	
Bills receivable	380,351.55	
Stocks owned in other companies	3,130,200.92	
Patents	1,000.00	
Mdse., raw, wrought and in process.....	4,172,222.14	
		$20,682,332.93

LIABILITIES.

Capital stock.....	$5,550,000.00	
ACCOUNTS PAYABLE:		
Loans from parent co..$2,333,756.23		
Current accounts and bills payable 1,067,630.75	3,401,386.98	
Reserve for contingencies, Jan. 1, 1908	848,157.08	
Additions for 1908	141,267.63	989,424.71
Surplus Jan. 1, 1908....$10,632,701.97		
Less dividends paid 1908	928,698.61	9,704,003.36
		$19,644,815.05
EARNINGS FOR 1908.....		$1,037,517.88
Surplus Jan. 1, 1908....$10,632,701.97		
Less dividends paid 1908	928,698.61	
	9,704,003.36	
Earnings for 1908	1,037,517.88	
Surplus Jan. 1, 1909....	10,741,521.24	

Compared with the statement of January 1, 1908, there is a shrinkage in the cash assets from $60,664.04 to $4,979.88 and in the amount due from subsidiary companies from $2,533,756.23 to $2,333,756.23. There is an increase in the accounts receivable from $18,173.46 to $19,078.79 and a decrease in the Birmingham Brass Company investment of from $171,414.04 to $168,161.83. There is a decrease of $258,031.04 in the total of assets from the statement of January 1, 1908, and the total of liabilities is decreased by the elimination of items of $225,000.00 debentures and $9,833.33 accrued interest, which appeared in the 1908 statement, and by $23,197.71 reduction in the surplus.

The American Brass Company includes the following corporations: Coe Brass Manufacturing Company, with plants at Torrington and Ansonia, Conn.; Benedict & Burnham Manufacturing Company, Waterbury, Conn.; Waterbury Brass Goods Corporation, Waterbury, Conn.; Waterbury Brass Company, Waterbury, Conn.; Ansonia Brass and Copper Company, Ansonia, Conn.; Chicago Brass Company, Kenosha, Wis.

The officers and directors are: Officers, Charles F. Brooker, president; Edward L. Frisbie, Jr., first vice-president; Alfred E. Cowles, second vice-president; James S. Elton, third vice-president; John P. Elton, treasurer; Gordon W. Burnham, secretary; James A. Doughty, assistant secretary. Directors: Charles F. Brooker, James S. Elton, Alfred A. Cowles, Arthur C. James, Gordon W. Burnham, John J. Sinclair, Edward Holbrook, Edward L. Frisbie, Jr., John P. Elton, Cleveland H. Dodge, Thomas B. Kent, T. Brownell Burnham, Chandler N. Wayland, James A. Doughty, Edward T. Coe.

PRODUCTION OF COPPER, LEAD AND SPELTER IN THE UNITED STATES IN 1908.

An early estimate of the United States production in 1908 of copper, spelter and lead, the three principal non-ferric metals, has been prepared by the United States Geological Survey, which also furnishes approximate figures of the production and movements across the border.

Except one small company producers of blister and lake copper have furnished their latest exact figures; in most cases they are for 11 months, with estimates of their production for the remainder of the year. If these estimates are realized the production of blister and lake copper in 1908 will be greater than 1907 by about 22,321 gross tons, or an increase of 5 or 6 per cent. This would give a total production of approximately 410,000 gross tons. The total importations of copper are estimated at 93,300 tons, compared with 106,247 tons in 1907. The exports are estimated at 294,400 tons, compared with 227,200 tons in 1907. These figures were prepared by L. C. Graton, who has just issued a most excellent report on the production of copper in 1907.

The production of primary spelter from domestic and foreign ores is estimated at 208,000 tons of 2,000 lbs., as compared with 249,860 tons in 1907, 224,770 tons in 1906 and 203,849 tons in 1905. Imports of zinc ore aggregated 60,000 tons, practically all from Mexico, and show a decrease of nearly 50 per cent. from the quantities reported in 1907, which were 110,000 tons. The production of spelter in 1908 by States was as follows: Illinois, 49,500 tons; Kansas, 98,000 tons; Missouri, 10,000 tons; Oklahoma, 15,000 tons; Western, Eastern and Southern States, 35,500 tons. These figures were prepared by C. E. Siebenthal.

The production of lead was approximately 391,000 tons of 2,000 lbs., a decrease of about 6 per cent., as compared with 1907, when the production was 414,189 tons. In 1906 it was 404,699 tons. These figures are exclusive of an estimated output of 12,000 tons of antimonial lead in 1908 and 9,910 tons in 1907.

SOLDERING OF ALUMINUM.

A PROBLEM STILL TO BE SOLVED.

The problem of soldering aluminum seems to be still an alluring field for inventors. There is seldom a month but what THE METAL INDUSTRY receives word that another expert has discovered a successful method of soldering aluminum. These announcements are made despite the fact that the subject of soldering aluminum has been thoroughly investigated by metallurgists for a number of years and by as great an authority as the Franklin Institute, of Philadelphia, and the general conclusion of all of these findings was that while aluminum can be soldered, there would probably never be a successful aluminum solder the same as the common tin-lead solder. The reasons have been frequently published in THE METAL INDUSTRY and even in The Aluminum World some dozen years ago. However, as the subject as mentioned seems to be an interesting one to metal workers, we herewith reprint from the Scientific American the method of soldering aluminum which brings the subject up to date. The matter is written by William Hoopes, an electrical engineer employed by the Aluminum Company of America.

HOW TO SOLDER ALUMINUM.

BY WILLIAM HOOPES, E. E.

There is no solder which operates with aluminum in the same way that ordinary solders operate with copper, tin, etc. There are two reasons for this.

First. Aluminum does not alloy readily with solders at temperatures as low as the other metals require, and it is consequently necessary, in soldering aluminum, to use a much higher temperature. Furthermore, aluminum alloys with lead only with great difficulty and with but a small proportion of lead at that; consequently lead solders are useless with aluminum.

Second. The surface of all aluminum is covered with a thin invisible coating of aluminum oxide. This coating forms instantly on the surface of aluminum and is very refractory, and its presence is responsible for the high resistance of aluminum to corroding agents, since, although aluminum itself is soluble in a great many chemical compounds, this protective coating of oxide is insoluble in almost everything excepting hydrofluoric acid. While in general this coating of oxide is beneficial, in that it forms a perfect protection to the aluminum underneath, it is, by reason of its efficiency in this particular, responsible for the principal portion of the difficulty which occurs in soldering aluminum, as naturally no solder will alloy with aluminum oxide.

In soldering aluminum, therefore, it is necessary that this oxide must be removed before the soldering can take place; and as it forms again instantly after removal, it is necessary that the removal of the oxide and the covering with solder shall be simultaneous. In soldering other metals, the oxide can be removed chemically. With aluminum this is not possible, and it must be removed mechanically by abrasion.

Bearing these facts in mind, it will be readily understood how aluminum soldering must be done. All the surface to which it is intended that the solder shall adhere must first be tinned. This is accomplished by heating the metal to a temperature above the fusion point of the solder used, and then rubbing the surface with a stick of the solder, thus rubbing the oxide off the surface with the solder itself, and covering the exposed points with melted solder, all in the same motion. In order to make sure that the tinning is thorough, it is better to rub the surface with a steel or brass scratch brush while the solder on this surface is still molten. This insures a thorough job of tinning. After the edges to be united are thus tinned, they may be sweated together with pure block tin, with the aid either of a soldering iron or blast lamp.

With regard to the composition of aluminum solders, zinc appears to alloy with aluminum more readily than any other metal available for the constituent part of the solder; consequently all solders which will readily tin aluminum contain zinc in varying proportions. The solders which we have found to be most satisfactory are composed usually of tin, zinc and a very small proportion of aluminum. These solders do not run very freely nor fuse as readily as ordinary solders, and it is necessary, as stated above, to use a higher temperature—so high in fact that extreme difficulty is found in using these solders with a soldering iron, and it is generally necessary to use a blast lamp.

Another thing which must be borne in mind is that solder will not flow into an aluminum joint, even when tinned, by capillary action as it does into copper or tin joints, and it is therefore necessary to place on the surfaces to be united all of the material necessary to sweat them together before the edges are brought into contact. In soldering aluminum joints, it is necessary that both the tinning and sweating small be most thoroughly done; otherwise the joint will not be durable.

On account of the presence of zinc in the tinning solder, the solder is decomposed by moisture, and unless the work is so well done that the joint is absolutely waterproof, it will not be durable. The quality of the workmanship has more influence than anything else on the permanence of the work.

FUSIBLE ALLOYS AND SOLDERS.*

The following table shows the composition of some solders and fusible metals in common use.

Alloy.	Lead.	Tin.	Bismuth.	Other constituents.	Melting point. C°	F°
Solder 1	96.15	3.85	....	.....	292	558
Solder 2	90.9	9.1	....	.....	283	541
Solder 3	83.3	16.7	....	.....	266	511
Solder 4	75.0	25.0	....	.....	250	482
Solder 5	66.7	33.3	....	.....	227	441
Solder 6	50.0	50.0	....	.....	188	370
Solder 7	40.0	60.0	....	.....	168	334
Solder 8	33.3	66.7	....	.....	171	340
Solder 9	33.3	33.3	33.3	.....	140	284
Steam boiler plug alloy 1.	48.4	....	12.8	Zn = 38.8	171	340
Steam boiler plug alloy 2.	44.5	....	22.2	Zn = 33.3	141	285
Steam boiler plug alloy 3.	42.1	....	42.1	Zn = 15.8	123	253
Steam boiler plug alloy 4.	10.0	40.0	50.0	.....	116	240
Sir Isaac Newton's alloy.	30.0	20.0	50.0	.....	100	212
Alloy suitable for casts..	31.25	18.75	50.0	.....	98	208
Rose's alloy	28.1	21.9	50.0	.....	95	203
D'Arcet's alloy	25.0	25.0	50.0	.....	93	200
Wood's alloy	25.0	12.5	50.0	Cd = 12.5	60	140
Lipowitz's alloy	26.9	12.7	50.0	Cd = 10.4	66	150
Expanding alloy	66.7	....	8.3	Sb = 25.0	66	150

Solders 5, 6, 7 and 8 are those commonly used by plumbers and tinsmiths. Solder 6 is probably the one most generally used, although solder 8 is especially adapted for use with lead and tin pipes. Solder 9, with 33.3 per cent. bismuth, has a very low melting point, and is suitable for various household purposes, being readily applied over a gas jet or candle.

*Compiled from a paper on Engineering Alloys in The Chemical Engineer.

THE RECOVERY OF PRECIOUS METALS FROM JEWELERS WASTE.

AN EXHAUSTIVE TREATISE ON THE SUBJECT, INCLUDING ALL FORMS OF WASTE.—TO BE CONTINUED FOR SEVERAL ISSUES.

BY JOSEPH CAUFFMAN.

(Continued from February number.)

ASSAYING.

The sieved sweeps are to be mixed thoroughly, the more so if several subsequent sievings have been added from re-grinding, as each lot is of a different degree of richness. A sample is then taken as with ores, and run down in a testing crucible in the usual manner, by adding a flux of litharge and bicarbonate of soda with a little carbonate of potash and borax, and a small spoonful of flour—all these are mixed with the sweep sample before it is put into the furnace, and a tablespoonful of salt is put on top. After this is melted clear, and cooled, a button of lead is found at the bottom, and this contains all the gold and silver that was in the sample. This button is cupelled in a bone-ash cupel (as above), and parted and the gold and silver weighed; from these weights we determine the total gold and silver in the sieved sweeps. If the button will not dissolve in the nitric acid, due to more gold than silver being present, a little pure silver must be added on the cupel, wrapped in pure sheet lead; this is again cupelled, and weighed and then parted, and the gold weighed. This added silver must be allowed for in calculating the silver in the metal tested; it need not be weighed, but the button must be weighed before adding the silver, and the weight of the gold subtracted from the weight of the original button. The weight of the button after the extra silver is added, need not be taken.

If the original button is quite yellow, add three times its weight of silver; if slightly yellow, twice its weight, and if nearly white, equal parts. Both the sheet lead and the silver added should be first tested, as the latter may contain gold, the former silver and gold, and this would render the test worthless unless allowed for. If they are impure in this way, they should not be used; but if no others can be obtained, they can be used after determining just how much precious metal they contain, and this quantity must be subtracted from the totals of each metal obtained in cupelling.

TREATING THE MATERIALS.

These sweeps are run down in a lead furnace, as stated above, and the gold and silver recovered in the pig lead resulting; the latter is refined and the precious metals extracted by well-known processes. This lead furnace method is employed with large quantities of sweeps, but when the quantity is small or the material is unusually rich—or both—they are melted down in a crucible, when the contents are obtained much quicker. This method is used with jewellers' polishings, which are extremely rich, and with any other substances where it seems desirable. For instance, when the foreign material consists entirely of organic matter, such as rags, paper, cloth, etc., it is reduced, after burning, to a small handful of ashes, which can be run down in a small crucible, with little trouble and in a very short time.

DENTISTS' CARPETS.

It is surprising how valuable these become after years of use. Dentists who have sufficient foresight to foster this source of addition to their income, will find that in later years a neat little sum will come in, with no cost or trouble to themselves; but we imagine that they have a hard time to keep the neat housekeeper from swooping down with cleaning apparatus; imagine the feelings of such a person at the notion of leaving a carpet unswept for years! Still, it is not really necessary to omit sweeping, if the victim can manage to impress on the maid the necessity of keeping every ounce of dust thus swept up, for this can be accumulated and sold. Even with the most thorough sweeping, however, small filings of gold will settle deep into the fibre of the carpet and there quietly remain, provided said housekeeper does not tear it up to be beaten—when goodbye to the gold dust and filings! The writer once received a small carpet from a dentist and thought it a pity to burn it, as it was clean and fresh-looking—not nearly worn out; but—orders are orders, and business is business, so into the furnace it went, and was reduced to a few handfuls of clean, soft ashes. The carpet was originally only about eight feet square, but it yielded nearly $150 in gold and silver!

In burning these carpets, they must be handled with great care, or some of the dust will be shaken out and

SWEEP REDUCING FURNACE.

lost. They should be thoroughly wrapped or boxed for transportation, and should be dumped into the furnace without opening, for this risks loss, while the wrapping paper does not interfere with the process. If, however, for any reason the package must be opened, let it be done not far from the furnace, but preferably directly in front

of it, and then the floor in the immediate vicinity must be carefully swept up and all sweepings thrown into the furnace with the carpet. This is to be done before the furnace is lighted, so that the carpet can be carefully placed inside without losing anything, and also because, if thrown into the heated furnace, combustion is too rapid, and part of the material may be projected out of the furnace and over the floor, or drawn up the chimney. This treatment applies also to all sweeps consisting of light material, such as paper, rags, etc. (after which it is put into the tumbling barrel as described).

FILINGS AND DUST.

The list of waste materials to be handled in this manner, or in similar ways, is almost unlimited, from the many trades handling gold and silver. The commonest are the various forms of jewelers' waste, which embrace, besides the sweepings, also filings, from the work tables, polishings, clippings, etc. The filings and clippings are not treated as sweeps, as they are too valuable, consisting almost entirely of precious metal, so they are separated by chemical means. From the work-tables the clippings and pieces of gold and silver are picked up and kept separate, and form the most valuable class of waste. Then there remains on the tables and instruments a quantity of filings and dust, which are swept into a box and form the second class. Of course a small quantity falls on the floor, and this goes into the sweepings. The clothes of the workmen absorb a quantity, so they are never thrown away, but are burnt up like the carpets and sweeps when worn out. The floors, of course, catch a fair quantity and hold it between the boards, and this cannot be swept out; but when they need repairs, the boards are torn up and burnt, while from underneath is taken the accumulated dust and dirt of years, forming another portion of the sweeps. There is still another source, for nothing is omitted. Every night when the workmen wash up before going home, these washings are saved. The quantity that clings to each man's hand may be infinitesimal, but remember the old proverb about little drops of water; by and by the little bit from each pair of hands amounts to a large quantity, in point of value at least, and costs nothing to accumulate. The men can either wash in small portable basins and then pour the washings into a barrel kept for the purpose, or an ordinary sink can be used, without, however, a drainpipe; the water runs off into a barrel which is stood just under the bottom of the sink; after standing all night, all valuable metal has settled, when the water can be carefully dipped out and thrown away, but care must be taken not to agitate the liquid at the bottom, or the sediment will be disturbed, and part of the metal dust dipped out with the worthless water. It is not, however, advisable to take more of the water out than is necessary to keep the barrel empty enough to hold each night's washings, and when there is enough accumulation to work up, the experts will attend to the matter. The barrels are then emptied into the refiners' cans, etc., and when received at the smelter, are dumped into shallow metal pans and slowly heated until the water has evaporated, leaving a mass of dry powder, which consists of gold and silver dust, ordinary dirt, soap, etc. This is handled as above—burned and tested.

CLIPPINGS.

The jewelers' filings and clippings, if clean, can be melted down at once, consisting practically entirely of gold and silver, and then parted. The quickest way to bring this about is not to cast the metal into bars, which dissolve slowly, but to granulate the metal, which is an interesting and pretty operation. The melted metal is taken out of the furnace while glowing and perfectly liquid, and the crucible is held about six feet in the air, the holder standing on a chair or box, and pouring the contents slowly, but steadily, into a large earthen or wooden jar or tub, filled with cold water, which must be kept stirred by another man; an ordinary broom handle is as good as anything, and has the advantage of being light. This stirring is done to keep the metal from falling in one place and sticking together. When the metal has all been poured, the water is dipped off and the gold and silver are found on the bottom in small granules, from round shot to various fantastic shapes like flowers and animals. This form of metal is easily penetrated by the acid, which dissolves the silver, and also the copper that was alloyed with both the gold and the silver; the gold remains as a brown powder, like cocoa. If there is too much gold, the alloy may not dissolve (as with the test buttons), when silver must be added. The manner of getting the gold and silver out pure is described later.

If the clippings and filings contain iron in small pieces or filings, these must be removed with acid before melting (if drawn out with a magnet, they would take fine gold and silver out with them); but if the material contains dirt or grease, this must first be burned out, or the acid cannot act. This is done in a crucible, or a flat iron pan over a fire, which removes all foreign matter such as dust, paper and grease. This burning must always be done when the material is dirty, whether iron is present, or not. The latter is dissolved out with cold, weak hydrochloric (muriatic) acid—one part commercial acid to two of water. This acid attacks only the iron, leaving the gold and silver intact. Weak sulphuric acid will accomplish the same result. This procedure was recommended above, for removing iron filings from sweeps which are to be melted down in a crucible. Nitric acid (half strong acid and half water) can also be used, but this dissolves the silver out at the same time; the latter must then be separated from the iron by precipitation. The solution is filtered off and salt water added, which forms silver chloride; this in turn is filtered from the iron solution, the latter is thrown away, and the silver chloride handled as described later.

Silver will dissolve somewhat in heated strong hydrochloric acid, and also in sulphuric acid in the same condition, but these acids when weak have no effect on it. Nitric acid, however, either weak or strong, attacks it immediately.

PLATINUM.

If the filings and clippings contain platinum, they should not be melted, as, in parting the metals, the platinum partly dissolves with the silver. In this case, an entirely different process is employed. After burning and cleaning the material, all iron and silver should be dissolved out with nitric acid, leaving gold and platinum. Large pieces of platinum should be picked out and laid aside, and the balance treated with aqua regia—a mixture of two or three parts of hydrochloric acid with one of nitric. The metal is put in a shallow porcelain dish on a water bath, under a hood (where all such operations should invariably be conducted, as the vapors are highly injurious, and the operator can be quickly overcome by them). Then the gold and platinum are covered with the aqua regia, cold, and the water bath gently heated, if hot at the start, the action is too quick, and part of the valuable liquid may be carried out by foaming (due to the rapid escape of gas), and be lost. This can, however, be remedied by covering the dish with a pane of glass, but a small part must be left uncovered so that the gases can escape.

(To be Continued.)

INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

A NEW ENGLISH TILTING FURNACE OF WONDERFUL EFFICIENCY.

A remarkable furnace of this type has been put upon the market recently by Messrs. Shaw, Cooper & Company, Birmingham, England. It is known as the M. V. R. Brass Melting Tilting Crucible Furnace, and is backed with strong guarantees by the company. They guarantee that one man working one furnace will melt in one day 7 heats of metal (either copper, gun metal or yellow brass) capacity 400 to 440 pounds per heat, with a coke consumption of no more than 56 pounds per heat; or 1 pound of coke for 8 pounds of metal melted.

It is claimed for this furnace that:

1. Coke consumption 50 per cent. less than other furnaces.

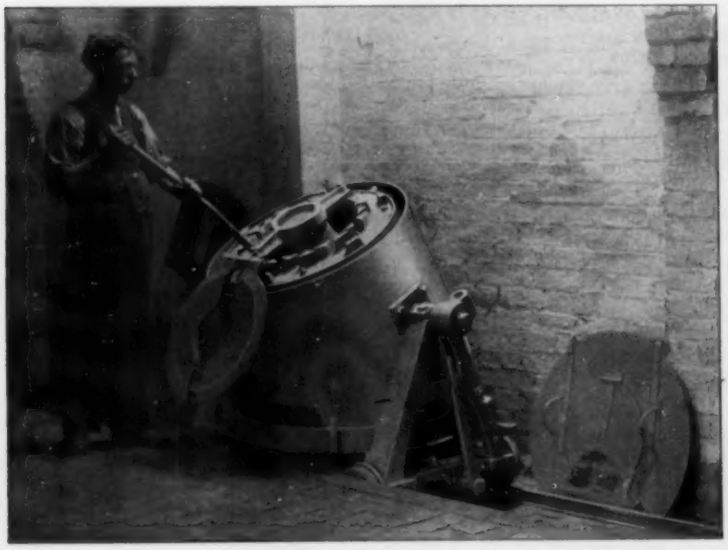


FIG. 1. FURNACE INVERTED.

2. Crucible expense very considerably reduced.
3. Caster's ashes reduced from 85 to 90 per cent.
4. Labor: one man to melt 7 to 8 tons per week.

The life of a crucible is from 50 to 54 heats, and some users have reported 60 to 85 heats per pot.

The furnace as shown in Fig. 1 consists of an outer steel shell and an inner shell of refractory material. The crucible rests on a solid bottom casting as shown in Fig. 1, and the coke is put around it. A blast of air at a pressure of one ounce enters at the top of the outer shell, and passing down through the space between it and the inner shell, enters the combustion chamber at the bottom through a series of staggered openings in the lining.

By this arrangement a "contused" blast is obtained as against a "cutting" blast, and thereby saves the crucible from severe oxidation, thus prolonging its life. Actual runs in the furnace have shown a shrinkage loss of less than ½ of one per cent. Provision is made to take care of spilled metal, or that from a broken pot, so that no metal gets in the ashes, the amount of ashes from a day's run being half a wheelbarrow full. For melting scrap the furnace is equipped with a funnel, Fig. 2, which is filled up and its contents gradually settle down as melted, until the crucible is full.

The furnace has been tried out in this country with great success at the plant of the Nathan Manufacturing Company, 416 East 106th street, New York, under the direction of W. L. Abate. A recent run there gave a melting of 3,450 pounds of red bronze with a consumption of 330 pounds of coke or 10 pounds of metal per pound of coke. The time was 9 hours and divided up between 8 heats. The first crucible used gave out on the 43d heat, and its failure was due more to improper handling than actual wear and tear. The metal produced was found to run, 1,800 pounds tensile strength higher than metal made of the same composition and melted at the same time in an oil blast reducing furnace. As a result of these trials the Nathan Company have practically decided to equip their entire foundry with this furnace, thereby displacing three different types now in use. This furnace is covered by patent rights in United States, England, France and Germany, and is now being manufactured here under the supervision of R. F. Goyne, Hotel Frederic, Broadway and Fifty-sixth street, New York. Mr. Goyne is prepared to furnish literature and data concerning the furnace upon application.

FIG. 2. SHOWING HOPPER.

A NEW AMERICAN TILTING FURNACE.

A furnace that bids fair to revolutionize the methods for the melting of a large amount of easily oxidizable metal is the tilting crucible furnace recently invented by Chas. E. Bleyer, president of the Hawley Down Draft Furnace Company. Cuts of this furnace are herewith shown.

The furnace is called the Reyelbec Coke Tilting Furnace, and consists of two shells, Fig. 1, the inner shell, being the furnace body, the outer shell for holding and preheating the air. The shells are made of sheet steel with riveted side seams. The top and bottom are cast iron, flanged and bolted to the steel shells. The auxiliary bottom for receiving ashes and spilled metal,

FIG. 1.

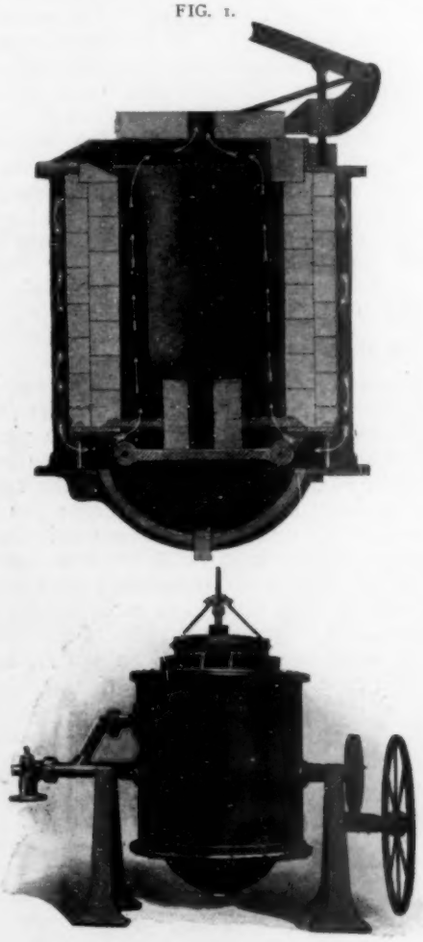


FIG. 2.

THE REYELBEC CRUCIBLE FURNACE.

which works on a hinge, and is held in place by an attachment, is also flanged and bolted to the steel shells. The furnace has two grates, one for the fuel which rests on the bottom flange; the other, which works on a hinge, supports the crucible. The steel trunnions are riveted to the shells; they rest on cast iron legs bolted to a cast iron base. The furnace is tilted by means of an ordinary hand wheel, worm and gear, Fig. 2. The lining is made of high grade fire tiles, laid in an inner and outer ring. The outer ring requires no repairs. It is easy and inexpensive to put in a new lining when necessary.

The crucibles are very much the same as the standards of corresponding numbers, except that they are higher and have less bilge, as no tongs are required to lift them out of the furnace. They are made high because less area of metal in proportion to weight is exposed to oxidation. Prices the same as standards of equal capacity. The cover consists of a circular fire tile, banded with iron to prevent cracking and to support attachment for lifting. It is attached to an automatic lifting device, which can be swung from either side. But this cover need not be lifted at all, when pouring, unless desired. This is a distinct advantage in the protection of the molten metal and is also a matter of much comfort to the operator, as he is fully protected from the open heat while pouring. Anthracite coal or coke can be used. Of the two, coke is preferable, as coke is easier on the crucible. A fan blast of one ounce is sufficient for the operation of this furnace; this is delivered by a small low pressure fan or blower, either directly connected to small motor or belt driven. The air connection is not disturbed while the furnace is being tilted.

The cost of melting with the Reyelbec Coke Tilting Furnace is about half that of oil-fired crucible furnaces. This is taking into account the life of crucibles, the increased number of heats, life of lining, the average cost of the fuel, all repairs, interest on investment and shrinkage of metal. The advantage over the oil-fired crucible furnace is the elimination of noise, the siphonic action of the oil and air flame, the air compressor and the oil pumps. The absolute control of fire, perfect combustion, no oxidizing flame and no oil connection to get out of order. The increased life of crucible, the even distribution of the heat and the uniform temperature of the furnace. The superior quality of the metal and lower loss by oxidation. The advantage over other coke or coal-fed furnaces, is the furnace can be tilted without disturbing the air connection, without raising the cover and the blast being continued while pouring. The air is preheated before it enters combustion chamber. No locking ring for grate bars and air supply, and no pit in floor. No cold air can attack the crucible at any time. The operation of the furnace is noiseless, because no high air pressure is used—a blast of one ounce being sufficient. Not affected in any way by weather conditions; a high, low, quick or slow fire may be had when desired. No chimney is needed; furnace under control of operator at all times.

The furnace is adapted for melting any metal which can be melted in a crucible.

THE AIR BRUSH IN THE METAL TRADE.

Such rapid strides have been made during the past few generations in the manufacture of improved machinery of every description, and manufacturers have so eagerly taken advantage of every new machine or device whereby they could improve or cheapen their output, that it is to be remarked that more attention has not been given in the past to the question of applying lacquers, paints, enamels, japans, varnishes, bronzes, etc., to manufactured articles, by mechanical means. The old methods of brushing and dipping have serious objections, being troublesome and wasteful, and the finish on many articles requiring more coats than should be required, while the result from either finish is not what is desired. These facts were recognized as far back as 1900, at which time the "Eureka Pneumatic Spray Co.," of 400 Canal street, New York City, placed on the market a patented air brush or sprayer of improved design, capable of handling any of the above-mentioned materials without trouble, and producing at a saving of from 25 to 80 per cent., doing the finest grades of work, such as lacquering brass bedsteads, chandeliers, art goods, jewelry, buckles, electrical

work, hardware, etc., and japanning such articles as typewriters, parlor clocks, fireplace fronts, piano plates, scales, etc.; enameling of finest of furniture, woodwork, computing scales, reflectors, etc.; bronzing all manner of picture frames, mouldings, stoves, radiators, reflectors, novelties, etc., and japanning or painting anything from the smallest articles up to freight cars, and in fact the cars, locks and bridges on the Panama Canal. It follows that a concern which does nothing but this class of work, and who have made a careful study of it, are in a position to advise manufacturers as to the beast means of finishing their work, and the necessary devices for handling it, so that it may be done quicker, whether it be done by revolving, racking or otherwise. The Eureka sprayer or air brush is made in three sizes—pint, quart and gallon—the nozzle attachments being interchangeable. The concern endeavor in every case to learn the nature of the work and material with which it is done, and send the sprayers out with the most suitable attachments and with special instructions to fit the case. It is the only sprayer made entirely of brass, and the only one on the market having a patented agitator which keeps such materials as bronze, red lead and pigments stirred while using. The adjustment features of it enables manufacturers to operate it with far less air than any of the crude sprayers on the market, the latter being built without considering the important question of economy in the use of compressed air. Another valuable feature of this sprayer is that the pot or reservoir can be detached by pressing a latch and giving a light twist, thus permitting of cleaning and refilling in an instant, without unscrewing of unions or top member. Hundreds of manufacturers are using them, and testify as to their merits. Whatever your goods are, and whatever material you use, this concern would be pleased to learn the nature of your work and material, number of operators under present process, and to advise you the best method of handling your work and the probable saving.

Also the Eureka people have a large line of their own air compressors, varying in size from 1 cu. ft. per minute to 3,000 cu. ft. per minute, of any type desired. They also keep in stock all sizes of tanks, with necessary gauge and safety appliances, and can fill the wants of any manufacturer perfectly in a day's notice. So confident are the Eureka Pneumatic Spray Co. of the superiority of their goods that their offer is always open for manufacturers to send them sample work and their own materials, prepaid, and they will finish it and send back for inspection. They also handle a great many models of artists' air brushes, suitable for decorative or art purposes in many lines of work. Catalogues and circulars will be sent upon request. The products of this company have been greatly improved since they were mentioned in the columns of THE METAL INDUSTRY during 1907.

THE AEROCHUCK AND SOME OF ITS APPLICATIONS.

ALLIGATOR JAW, MASTER HINGE COLLET, RELEASING AND STAR CHUCKS.

The Manufacturers' Equipment Company, of Chicago, Ill., has improved and developed the chucks which are opened and closed by compressed air, to a degree that makes them a very handy and valuable tool for holding a large variety of work while it is being machined.

The chucks are made in a number of different styles, and several different sizes of each style, and there is hardly any limit to the variety of work, or unshapliness of the piece, that can be held in them. They grip the piece instantly and firmly, irrespective of the oddity of its shape, and keep a steady pressure on it until released by turning off the air, after which the work can be removed without stopping the machine. The construction of the chucks is such that they can be put on any make or size of machine at the works where they are to be used, and in a few hours.

ALLIGATOR CHUCK. FIG. 1. MASTER HINGE COLLET CHUCK.

COLLET CHUCKS.

The draw-in collet chuck, a master hinge collet, with four jaws, is shown on the right hand side of Fig. 1. The jaws are shown taken out of the body of the chuck, in order to show the simplicity of its construction, and the piece which the jaws are designed to hold is standing between them and the body.

As will be seen in the illustration, four loose jaws are fitted to a round opening in the four collet jaws, and these are shaped so as to fit and grip the piece to be machined. The loose jaws are held in place by screws which pass through the collet jaws, and the collet body has four holes in its side so that the screws can be taken out, the loose jaws removed and others put in their place, without taking the chuck apart. Thus one chuck can be made to hold a large number of different sized and shaped pieces, by making loose jaws to fit each.

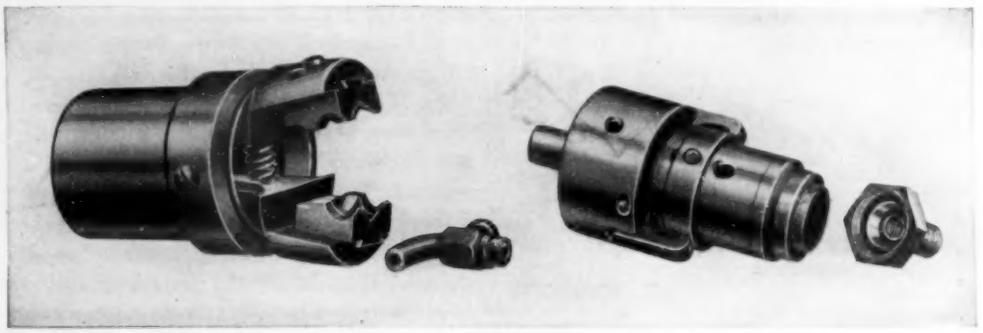
This chuck finds its greatest usefulness on round work, but it can be used equally as well on square, hexagonal and other shapes of a similar nature.

To use the chuck on a lathe, the body of the chuck is first screwed on the spindle, after which the jaws are inserted and the small end screwed onto a rod which is attached to the piston located in the cylinder on the other end of the spindle. The air pipe runs under the machine and a valve is placed directly in front of the machine. By moving the lever on this valve forward, the air in the cylinder pushes the piston forward, consequently the jaws of the chuck are pushed forward and the work is loosened and taken out. Another piece of work is in-

serted and the air-valve lever pushed backward. This forces the piston tc the back of the cylinder and the work is gripped by the jaws drawing into the body of the chuck, over a bevel of 45 degrees in the front of the body. This allows the lathe to run continuously and the work can be inserted, gripped and taken out without stopping it, and with a corresponding saving of time. If for any reason the lathe should be stopped or started, it can be done by moving the lever located on top of the front spindle bearing. This pulls the wires at the back of the lathe and shifts the overhead belt from the tight to the loose pulley of the countershaft shown in Fig. 3.

composed of a centre arbor, the end of which is tapped to receive threaded arbors. Over this centre arbor is fitted a sleeve that is moved in and out by the two fingers shown on opposite sides of the chuck.

When working with this chuck the sleeve is pushed out as far as it will go by the spring on piston rod (which is connected or screwed to chuck); the piece of work, shown with the chuck, is screwed on the end of the arbor while the lathe is running, thus jamming it against the sleeve to hold it tight; the machine work is done; the lathe reversed the air used to pull the sleeve back, thus releasing the work which is removed by merely



ALLIGATOR CHUCK. FIG. 2. RELEASING CHUCK.

ALLIGATOR-JAWED CHUCK.

In the left-hand half of Fig. 1 is shown the same style of body with two alligator jaws fitted in. The jaws are shown to the right of the body with the work which these loose jaws fit. Another pair of loose jaws is shown in the foreground, with the piece they hold. A side view of this chuck, assembled, is shown in Fig. 2.

gripping it, and these operations are repeated for the next piece.

Thus, it will be seen that it is not necessary to stop the lathe to screw the piece on by hand, and it is not possible to jam it so tight that it cannot be taken off without a wrench, or a hammer, or both. Likewise it does not need to be stopped to take the piece off. Anyone can see

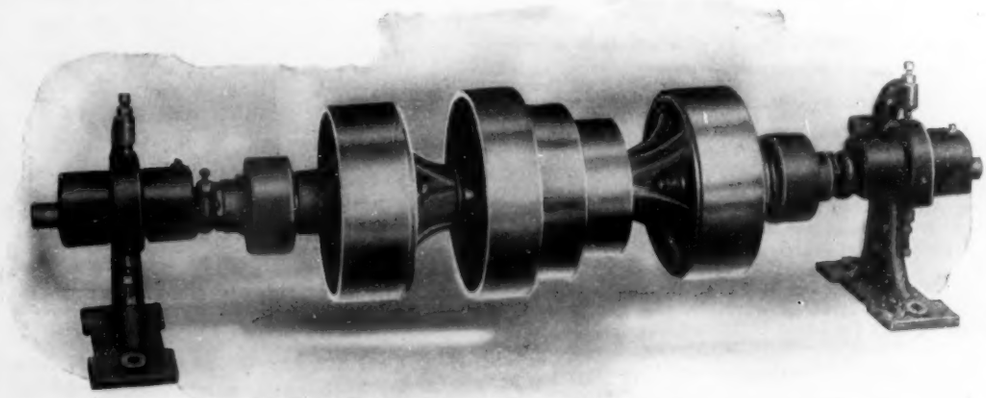


FIG. 3. COUNTERSHAFT.

The loose jaws which fit the piece to be machined, are dovetailed into the chuck jaws so they will not slip sideways, and they are held from slipping out by screws that go through the chuck jaws into them. The jaws are drawn in to clamp the work and forced out, to take it out of the chuck, in the same manner as the collet chuck.

The alligator-jawed chuck is designed to hold long or crooked pieces that could not enter the bodies of the collet or star chucks, and as both sides are open it will hold any piece that can be swung in the lathe.

RELEASING CHUCK.

The releasing chuck, with the piece of work it is fitted to hold, is shown in the right-hand half of Fig. 2, and it is mounted on the lathe with the same air cylinder and piston as the alligator-jawed chuck. This chuck is

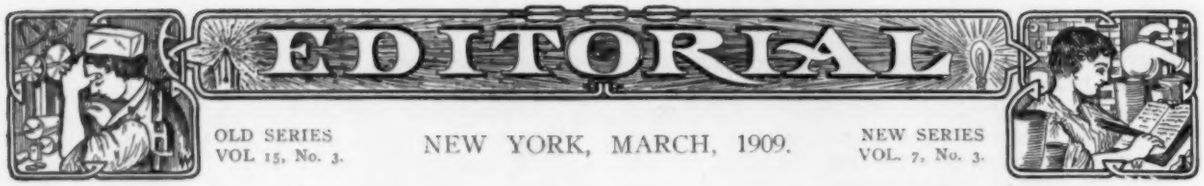
at a glance the saving in time that can be effected by the use of this releasing chuck.

The arbor with its sleeve can be taken out and another screwed in its place, that has been made to hold a piece of different size or shape.

CONCLUSIONS.

Where a number of pieces of the same kind are to be machined these aerochucks will, no doubt, give good results as to the ease with which the pieces can be chucked and centered, and consequently effect a saving in time.

The chucks described and illustrated in this article are made in standard shapes and sizes, but should any class of work require special shapes or sizes they would doubtless be supplied by the Manufacturers Equipment Company, 23-27 North Jefferson street, Chicago, Ill.



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CONTENTS

ASSOCIATED FOREMEN PLATERS.

Judging from the enthusiasm shown at the first meeting of Foremen Platers, held March 6, an account of which is given in another column, and also from the letters read at the same time from out-of-town platers, there need be no question raised as to the ultimate success of the society. Of course at the present time nothing has actually been done beyond appointing a constitutional committee, but as B. W. Gilchrist aptly said in his well prepared address, matters had progressed to the point of producing a spark and it now rests with the platers of America to so foster that spark as to cause a fire strong enough to weld together all of the platers of this continent in one solid body. The interest in this movement has been widespread, and expressions of encouragement have been received from Texas to Canada and from Maine to California. One enthusiast in the Far West sending in a liberal contribution with his indorsement without even knowing what will become of his money, all of which speaks well for the future of the new organization.

The advantages to be derived from such a society are manifold. In the first place the meetings of the association will prove an incentive for the plater to tell of his troubles, and the practical problems there presented will be discussed and solved to the benefit of all. The absent member getting just as much by the study of the literature thus manufactured, and now so scarce. Another important feature will be the solving in a scientific and accurate manner of many theoretical points, now only partially and imperfectly understood and not wholly coincident with practice. This latter object could be accomplished by a series of lectures by expert chemists upon subjects relating to the industry.

TRADE CONSERVATISM.

The question has arisen as to just how far a plater might go in imparting knowledge, which it might be claimed belonged to his employer; this is a matter which will really take care of itself. With the progress of the plating art generally and the impetus to be derived from the organization, the Platers' Association will soon be in a position to impart information rather than to seek it. The object of the association will be to help the plater in the broadest sense of the word and to foster a feeling of goodfellowship and equality among its members; both in a social and industrial way. We are of the opinion, that in a few years from now the secrecy now claimed to be prevalent in the plating business will be a thing of the past, and there will be in existence standard formulæ for the more common plates and finishes.

MEMBERSHIP.

The scope of the membership of the association is a matter likely to cause considerable discussion. Whether

it shall be confined to foremen platers only, or whether their assistants or firms engaged in the business shall be included, will have to be threshed out and decided. The matter will undoubtedly be brought up at the coming convention of The American Brass Founders' Association at Cincinnati next May. Dr. Moldenke, Secretary of the Association, will, it is understood, at that time attempt to form an American Metal Platers' Association, the scope of which will be to take in membership any firm or individual having anything to do with plating. The effect of this upon the newly formed society is problematical, but it would probably result in an amalgamation and the formation of an Association general in its character and cosmopolitan in its scope.

MANGANESE BRONZE FOR GOVERNMENT USE.

In another column we publish the reply of the United States Government to Mr. Jones' criticism* of its specifications for manganese bronze, and also Mr. Jones' last letter relating to the subject. It is noteworthy to remark that, while Mr. Jones, in his first article, inadvertently misquoted the requirements for elastic limit as given in the specifications, his contentions nevertheless were sound, and the subject matter requires no revision.

It is interesting to note that Mr. Jones' criticism has had weight and the Government has already taken steps to revise such portions of the specifications as seemed to need it and which were pointed out by Mr. Jones.

STANDARD METHODS FOR BRASS.

In this number of THE METAL INDUSTRY we publish a letter from Mr. Albert J. Hall, in reply to "Experience," who criticised* Mr. Hall's article on "The Complete Analysis of Brass, published in the November, 1908, issue of The Electro Chemical and Metallurgical Industry. Mr. Hall strikes a keynote when he makes a plea for standard methods and we have no doubt but that he will meet with hearty support in his views from brass chemists all over the land.

As we have had occasion to remark before, there arise before every chemist conditions which no one text-book covers at the present time, consequently one has to refer to a number, and in many cases make up his own scheme and fill in the gaps with knowledge gleaned from his own personal experience. Were there standard methods at hand which covered the more common run of work required in the average brass foundry laboratory, we are of the opinion it would make for uniformity of manipulation and consequent accuracy of results.

We can hardly agree with an esteemed contemporary, who in a recent editorial deplores the tendency of chemical analysis to commercialism, and seems to fear that publication and adoption of standard methods will aid in lowering, instead of helping to elevate the standard of industrial chemistry. He states that in the event of inaccurate work, the laboratory has only to take refuge behind the excuse that standard methods were used! We fail to see wherein such an excuse would avail; the mere fact that a standard method had been followed would not atone in any respect for inaccurate and unreliable results.

While it is undoubtedly true that analytical custom work has been systematized on a scientific basis, yet we would ask: Was not this inevitable in the rapid progress of industrial science? Has not the reducing of chemical analysis to a commercial science been responsible for a large increase in the volume of work done and therefore resulted in a more close control, chemically, of metallurgical operations? If a head chemist of a large concern or a firm of consulting chemists is skillful enough to reduce the routine work of the laboratory to a system, so that he can operate the laboratory at less expense than formerly, is it not to his credit, and does it not tend to make the laboratory more popular? No chemist wants to remain a routine worker or a "beak-washer"; he should have ambition to become head man and be a director and adviser rather than a mere performer. It is not the fact that an analysis is cheap that lends it charm, it is rather that it is both cheap and accurate that causes it to command respect and confidence.

The man at the head of the laboratory is the responsible party, and when he signs a certificate of analysis, he must know that it is correct irrespective of who performed the actual work or the method used. Standard methods will undoubtedly help many a struggling analyst thrown into a new position, where he is the only one of his class employed, and where he has all of the rule of thumb traditions and prejudices against him. Where he has no one in sympathy to consult with, and possibly not even a library at hand for help to formulate his schemes and methods of procedure.

It is such a man that standard methods will help and aid him in becoming an expert specialist and to take his place in the industrial world as an important factor in its success.

*Published in THE METAL INDUSTRY, January, 1909.

LARGE CONTRACTS TO BE LET.

The purchasing department of the Maxwell-Briscoe Motor Company, Tarrytown, N. Y., will shortly place contracts for several millions of dollars worth of materials that will be required for their 1910 production of 12,000 Maxwell automobiles. Among the items for which they are inviting bids are several hundred tons of brass and aluminum castings, 50 tons of babbitt metal, large quantities of brass tubing, brass cocks, heel board hinges, flush catches, door handles, hub caps, pulls, oil guns, copperized oilers, etc. A schedule covering the items of special interest to the brass trade will be found elsewhere in this issue and information regarding items not mentioned may be secured from the company's purchasing department.

Some of the requirements of interest to iron and steel manufacturers are 250,000 feet of steel tubing, several thousand tons of soft, cold-drawn, sheet, strip, chrome nickel, tool and gear steel; steel castings, 1,000,000 steel balls, malleable iron, grey iron cylinder and other castings, forgings, 1,000,000 stove bolts, nuts, screws, wrenches, 60,000 twist drills, files, etc. They also want bids on machining 12,000 crank shafts.

CRITICISM AND COMMENT

WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

COMPLETE ANALYSIS OF BRASS.

To the Editor of THE METAL INDUSTRY:

From the criticism that "Experience" made in the January number of your magazine of my article on "Complete Analysis of Brass," published in the November issue of the Electrochemical and Metallurgical Industry, I am certain that he has misrepresented my remarks either through misunderstanding or malice. I regret that they were susceptible to misconstruction. My critic seems to infer that I would advocate the replacement of expert men in the laboratory by inexperienced ones. That is not my purpose. No one is more anxious than I to see analytical work maintain a high standard of efficiency by competent men, and it was not my purpose to intimate otherwise. The results from a laboratory at all hazards should be dependable.

"Experience" says that I intimate that an inexperienced man could make the complete analysis of brass by following my own directions. My statement was "that any man with a common amount of technical training and reasonable ability can make the complete analysis of brass with accuracy." Note what my statement embodies: (1) "Training," that is, some preparation, in which, under competent teachers, one gains some experience in handling methods; (2) "Technical Training," that is, training of a scientific nature along specific and narrowly defined limits; (3) a common amount of such training; that is, a reasonable amount, and (4) a man of reasonable ability, certainly not one to whom my critic's term "ignoramus" could be applied. No inexperienced man could get reliable results in the laboratory, no matter how explicit the instructions. When I wrote the statement, "without any practical experience in this one line," I had reference to this one line (brass) of analysis.

Referring to the class of readers addressed, let me state more plainly. I had in mind, first, the chemist, who, though college trained, has never been called upon to make an analysis of brass, and, second, the apprentice, usually a man who has studied in college a short time, or a high school graduate, who, though possessing a small knowledge of chemistry, has general ability and training enough to use care, follow directions and get results. Hence, when one bears in mind that I had these two classes in view, I think that readers will agree with me that many of my seemingly minute details, so minutely and carefully criticised, though not needed by an expert chemist, will be found useful to the second class.

I did not include calculation of results in the article, except in one case, for the reason that I did not consider them a part of methods. If any man who analyzes brass has occasion to look up factors, calculations, etc., he has ability to do it. The remark about the formula of ferrous oxide being Fe_2O_3 is not worthy of mention, the error being a typographical one. The method for the determination of iron was taken from Blair's chemical analysis of iron, third edition, which does not mention the cooling of the assay before the addition of mercuric chloride. I desire to thank my critic for his scheme of drying copper plated cathodes, and for his suggestion about the arsenic determination. The method, only hinted at, is perhaps worthy of investigation.

The principal purpose of the article was to invite criticism in the way of suggestions of improvement of methods, not of personality, and to bring out, if possible, through these criticisms a standard method for the analysis of brass. It is hoped that more suggestions will appear on the subject, but complete enough to be of benefit to the analyst. I am certain that the criticism of "Experience" would have borne more weight with readers, and been more respected, had it been more temperate, and had it dealt with the definite subject of the analysis of brass, rather than typographical errors, minute details and personal implications, and had its author not shrunk from the manly custom of signing his name.

ALBERT J. HALL.

Detroit, Mich., February 2, 1909.

NICKEL PLATING—WEIGHT OF DEPOSITS.

To the Editor of THE METAL INDUSTRY:

According to modern chemistry, the specific gravity of nickel is given as 8.6 to 8.9 and the number of grams deposited by one ampere in one hour is 1.0907 (Blount), 1.0990 (Watt & Philip), 1.0940 (Standard Handbook—McGrau), 1.0940 (Langbein). The average would therefore be 1.0919 and Mr. Gilchrist seems to be rather high with his figure of 1.1062. Evidently, Mr. Gilchrist did not realize that my comparisons in the November number were made to show the inaccuracy of his test. I said that a deposit .00020" thick would weigh on an average .0169 gram per square inch and that his deposit of .001" would therefore give a weight of about .0800 gram per square inch. Mr. Gilchrist claims this deposit should be, theoretically, 0.1409282 gram. Now by actual measurement of the thickness and direct weighing of the deposit, I find that the average of a number of tests gave .0169 gram per square inch for a thickness of .00020" and therefore a deposit .001" thick would weigh about .0905 gram per square inch. (It should be remembered that the figure .0800 gram was merely approximate). It is evident that, based on my actual determinations, Mr. Gilchrist's deposit on iron if it weighed 0.1409282 gram would measure about .0016" in thickness. Now, instead of quoting the sentence in full, Mr. Gilchrist using the last part of the sentence only, took the figure which I used to show that his deposit was abnormal and from that worked backward to show that my figures were inaccurate, thus indirectly proving my point.

I grant at once that a current of one ampere running for one hour will decompose metallic salts and deposit a definite amount of metal. This is, of course, the main law of electro-chemistry, but to run a tank by this law it is necessary to know the cathode area accurately. In the tests which I made the cathode area was impossible to figure accurately, owing to the shape of the material and the fact that hollow parts receive less nickel than other parts. For this reason I use a test plate and determine the actual deposit of nickel on the plate in grams per square inch. This test is always comparative for my work, as I calculate the area for different material and then obtain approximate standards. The test plate serves further for microscopic and acid tests where the actual weight of nickel must be known on the part being tested. In my January letter I explained that absolute accuracy was doubtful and merely maintained, as I do now, that this test is of great value, comparatively, on loads of material where the area cannot be accurately determined. Every plater will grant the uncertainty of figuring deposit areas accurately on heavily loaded tanks. I grant without argument that Mr. Gilchrist has shown that, theoretically, my deposits are too heavy, but he neglects to credit me with having carefully stated that my figures were open to just such criticism.

There has been sufficient digression from the point at issue on the anode question and it has developed into a personal battle between two opponents. I for one feel that the arguments had better cease until they can again be brought up before the National Platers Society, where such discussions should be conducted. I will therefore close my part of the discussion with this letter, as I realize that these last arguments will be of little interest to those who were originally interested in the discussion on anode cleaning. I expect to have further arguments concerning the anode question and am preparing a series of tests which I sincerely believe will prove my side of the argument.

New York, March 1, 1909. PERCY S. BROWN.

WEIGHT OF NICKEL DEPOSITS.

To the Editor of THE METAL INDUSTRY:

I am deeply impressed with Mr. Brown's experiments with nickel plating from a sulphate of nickel solution. Cer-

tainly he has achieved remarkable results, which differ widely from experiments performed by recent investigators.

In his test No. 2 Mr. Brown states that under certain conditions he has deposited 6.019 grams of nickel in one hour, from a sulphate of nickel solution. I presume he means sulphate of nickel, although he calls it "single nickel solution," while from a "double nickel solution" he has deposited under slightly varying conditions, test No. 1, 4.08 grams in one hour! It is not for me to question the reliability of his experiments, but to simply state that I have never been able to obtain a deposit that could be weighed or measured from a sulphate of nickel solution.

Mr. Albert J. Hall, in the October, 1908, issue of THE METAL INDUSTRY, translating from the French of M. Brochet, states: "The electrolysis of nickel salts give poor results when used alone. . . . With the sulphate of nickel it gives complex salts which dissociate into cathions—ex, N. H., and anions (SO_4) Ni."

In the School of Mines Quarterly, January, 1908, pages 342 to 370, E. F. Kern and F. G. Fabian, giving their experiments on nickel plating from various solutions, state that with sulphate of nickel alone a very low cathode efficiency was obtained while the anode efficiency was very high, reaching ninety-five per cent. These experiments undoubtedly prove that deposits obtained from sulphate of nickel solution are useless and cannot be compared with deposits obtained from a double sulphate of nickel and ammonium electrolyte. They also prove that it is the sulphuric acid in the electrolyte that corrodes and dissolves the anode and not the amount of salt or sal ammoniac which it may contain.

EMMANUEL BLASSETT, JR.

Southington, Conn., March 10, 1909.

Shop Problems

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE OF THE METAL INDUSTRY. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

ALLOYING

Q.—Please publish the formula for making Britannia and pewter metals.

A.—For best quality of Britannia metal use,

Tin	94
Copper	3
Antimony	3

For common pewter use,

Tin	50
Lead	38
Antimony	12

This mixture is suitable for buckles, novelties, etc.—J. L. J.

Q.—Please publish a good brass or bronze mixture for making an emblem on sign 7" x 8".

A.—For an emblem like the one mentioned, name-plate metal ought to prove satisfactory. It contains, copper, 90; tin, 8, and zinc, 2. This alloy is hard, runs well and has a fine color.—J. L. J.

Q.—What is the best formula for linotype metal; also what is the cause of and way to remove white patches on the surface of bar solder.

A.—A linotype metal should contain no more tin than is absolutely necessary to meet the requirements of the work to be done. A good formula (which may be modified if necessary) is the following:

Lead	70
Tin	14
Antimony	16

The patches on the bar solder are areas of crystallization and the usual manner of giving the solder a better appearance is to add from 1 to 1¾% of antimony to it.—J. L. J.

COLORING

Q.—I would like to know of some composition that will copper color solder without plating.

A.—You can copper the soldered joints in the following manner: Prepare a saturated solution of sulphate of copper by dissolving as much of the copper salt as boiling water will take up. A pint or a quart, as you desire. To copper the joints apply a little of the solution with a brush and then touch the spot for a few seconds with a piece of clean iron wire. A copper deposit will result.

No. 2.—To copper zinc by immersion or brushing, dissolve 4 ozs. of sulphate of copper in one gallon of warm water; then add ammonia carefully to neutralize the free acid; this will produce a blue solution. Use by brushing or immersing of the article, a copper deposit will be the result. Wash the articles in clean cold water and dry out thoroughly to prevent staining.—C. H. P.

FINISHING

Q.—We have had trouble in getting a varnish for coating zinc frames for out-door signs. We find that after being subjected to the action of the weather for several months they begin to lose their color and corrode. Each frame is thoroughly cleaned with muriatic acid or cyanide before being copper plated. After plating they are varnished with the best quality of varnish we are able to procure. Can you give us any light on the subject?

A.—Your trouble lies in the galvanic action occurring between the copper deposit and the base metal zinc. On account of this action after exposure to the atmosphere the surface, as you think, corrodes, and becomes whitish and dull. This is the galvanic action referred to, whereby the positive metal zinc absorbs the thin coat of the negative metal copper and moisture assists this greatly. It would be advisable to coat the zinc before copper plating with a few minutes' deposit of nickel in a specially prepared nickel solution, and then after washing the articles, copper plate in your usual manner. After plating and finishing, use a good heavy colodion dip lacquer. For a nickel solution for zinc see index in December, 1907, issue.—C. H. P.

MIXING

Q.—I have been using up scrap nickel anodes by melting and making into new anodes. They are too hard; can you tell me how to overcome the trouble?

A.—A standard mixture for nickel anodes is the following:

Nickel	92
Old piles	4
Tin	4

When anodes of this composition are used in the plating bath, the nickel is dissolved out and most of the tin and iron remains. Hence, when scrap anodes are remelted they will be too hard because they contain too much tin and iron. If you sandblast your old anodes and make a mixture of 2-3 new metal and 1-3 old you ought to get better results.—J. L. J.

Q.—Can you give us a mixture that will answer for cranks used in a gas meter?

A.—One of the largest meter works in the country uses the following mixture for gas meter cranks:

Copper	88
Tin	10
Zinc	2

Castings from this mixture have been found satisfactory.—J. L. J.

Q.—Can you give us a formula for the bronze mixture that will stand the wear and tear of gear work?

A.—A good formula for gears with cut teeth is the following:

Copper	1 lb.
Yellow brass sheet	2 ozs.
Tin	½ oz.

A harder mixture that wears extremely well contains:

Copper	91½ lbs.
Tin	8 lbs.
Phosphorus	½ lb.

This metal is just about as hard as can be machined without chattering.—J. L. J.

Q.—How can we change "red" brass over to make it yellow brass mixture?

A.—If your material is red brass you can change it into yellow brass by adding 30 lbs. of zinc and 2 lbs. of lead to each 100 lbs. of the red brass.—J. L. J.

Q.—Kindly give formula for what is known as extruded bronze; what is it best adapted for?

A.—Almost any metal that can be rolled can be extruded, but you will find that nearly all the "extruded bronze" on the market is simply yellow brass. The extrusion process is best adapted for making unusual sections that it would be impossible or very difficult to roll.—J. L. J.

PLATING

Q.—My nickel solutions are pitting the work. The solution shows acid. How can I overcome it?

A.—As a remedy for pitting, prepare a solution as follows:

Boiling water	1½ gals.
Sal ammoniac	5 lbs.
Boracic acid	1 lb.

When dissolved, add this amount to every 100 gallons of nickel solution. If you avoid using the double nickel salts for some time and use only the single sulphate of nickel, you will not have much trouble from pitting. This is usually caused by an excess of hydrogen, due to a low content of metal in solution.—C. H. P.

Q.—Kindly publish a formula for a solution which will copper plate soft solder. I would prefer one that is made with carbonate of copper. What is the best pickle for 10-kt. gold?

A.—A good copper solution containing carbonate of copper can be prepared as follows:

Water	5 gals.
Carbonate of soda	16 ozs.
Bisulphite of soda	12 ozs.
Carbonate of copper	15 ozs.
Cyanide of potassium	16 to 18 ozs.

Use the solution warm, and anodes of soft sheet copper.

Try the following formula for removing the oxide or green color formed on gold by heat:

Carbonate of copper	2 ozs.
Ammonia water	4 ozs. by measure
Carbonate of soda	4 ozs.
Water	1 gallon

Add cyanide of potassium until 15 degs. Baumé is reached. Use this bath with a reversed current so that the polarity is just the opposite to plating. The cathode should be a sheet of copper and should surround the jar, if one is used, and connected with the negative pole. The centre pole should be the positive; placing the work on this pole and moving rapidly with a strong current will leave the articles bright instead of dull, as result from acid pickles.—C. H. P.

Q.—Can you give me a good method of mixing an acid copper solution for plating steel without doing much polishing?

A.—An acid copper bath for your purpose should contain 1¾ to 2 lbs. of sulphate of copper in each gallon of water with the addition of 2 to 3 ozs. of sulphuric acid and ½ oz. of yellow dextrine added. Use anodes of electrolytic copper. Articles of iron or steel must be previously coppered for at least 10 or 15 minutes in a cyanide of copper bath.—C. H. P.

RECASTING

Q.—Please answer the following questions in your journal: 1st, I want a formula to make new nickel anodes; 2d, a formula to make anodes of scrap nickel, and 3d, tell me if I did right in the following: I melted down 150 lbs. of scrap anodes, cast it into ingots, re-melted it and added 2 lbs. of tin, then cast it in sand molds, having molds on a slant. When I try to pour them in green sand they will not run.

A.—The formula preferred by most makers of anodes is as follows:

Nickel	92
Tin	4
Old files	4

To avoid losing the tin, the nickel and steel are melted together, poured into ingots and then remelted and the tin added. What is known as "wash iron" is better than old files, as it is very high in combined carbon. You were right in remelting your scrap anodes, but it would be better to use up the remelted ingots by adding a little at a time to a new mix than to use alone.

French sand will give you the best results, as it will dry hard and not wash.—J. L. J.

SOLDERING

Q.—Have you any record of a solder that will melt at the same temperature of the ordinary half and half solder, and which would have the color of copper?

A.—There is no low melting point solder which has the color of copper. If your work is of such a nature as will admit it, you might try mixing solder (lead 2-3 and tin 1-3), and while the solder was still plastic, cover it with strips of very thin copper foil.—J. L. J.

TUMBLING

Q.—We want to know how to get a fine finish by tumbling on small brass and nickel castings.

A.—In regard to the finishing by tumbling of small brass castings, we would say that this method produces a high lustre upon small nickel-plated articles and also small articles of brass. The process is as follows: Procure several gross of small nickel-steel ball bearings. These can be seconds, but should have the regular high polish. Place these with your articles in the tumbling barrel, and then add diluted borax water; ½ ounce to the gallon will be sufficient to soften the water. In a very short time the articles will have the appearance of having been burnished. Afterward remove the articles and dry out in the usual manner. Small brass castings after being tumbled smooth should be acid bright dipped, after which proceed as above mentioned for the final finish. This is the method now followed by a large number of concerns in the United States.—C. H. P.

TINNING

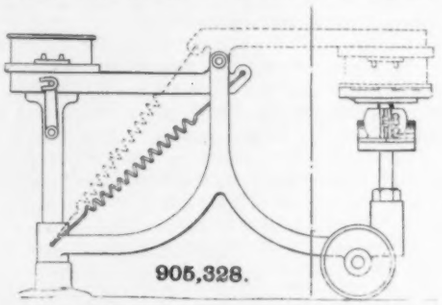
Q.—Please publish a process for the tinning of steel wire, stating what materials are used for wiping the surplus tin from the steel.

A.—The method used for tinning flat steel in the United States is as follows: The black oxide is first pickled from the surface with muriatic acid, using 2 parts of the acid to 1 part water. After cleansing, the articles are scoured by the aid of two revolving tampico bristle wheels and sea sand. The flat steel goes to the chloride of zinc flux and then directly into the molten tin. The tin pot should have two separate sections, one containing the tin only, the other containing tin covered to the depth of ½ inch with tallow cocoanut or palm oil; this makes the tin smooth; as the sheet comes from the bath it is passed through felt or oakum; this and the oil removes the surplus tin. The operation is continuous after pickling in the muriatic acid, viz.: Scouring, passing by the aid of revolving rolls to the flux, and then in the same manner to the first and second, or finishing, tin baths, and thence through the wiping rolls to the revolving spool. By using a rapid movement through the tin the temper of the steel is not impaired.—C. H. P.

PATENTS

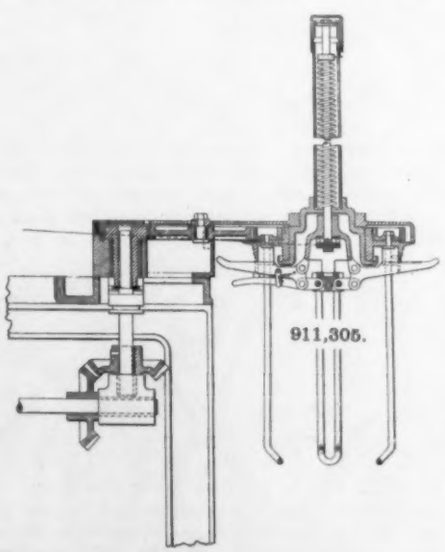
REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

905,328. December 1, 1908. MOLDING MACHINE. William C. Kneale, Indianapolis, Indiana. In all molding machines of the rock over type, it has been found in practice that the surfaces of the molding boards used in connection with the molding flasks warp and twist after a little use, which is due to the moisture in the sand mold with which they contact, so that when the molds



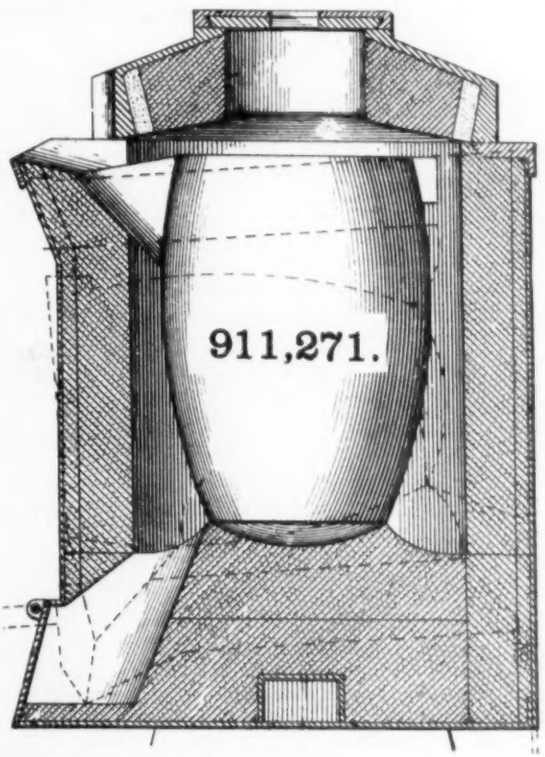
with their molding boards are turned over upon the mold receiving table, the boards are not stable and are easily rocked or tilted, and the pattern when being withdrawn from the mold, will break same, and in some cases will destroy it beyond repair. The aim of this invention is to provide a device whereby the mold receiving tables of the machine are automatically adjusted to the uneven warped surfaces of the molding boards.

911,305. February 2, 1909. INVERTED DRUM FOR WIREDRAWING MACHINES. James A Horton, Providence, Rhode Island, assignor to Iroquois Machine Company, New York. A device intended to provide for the regular downward discharge of the wire, wrap by wrap, instead of its irregular discharge in masses or groups of wraps. The construction as shown in cut, con-



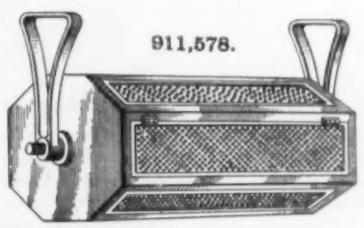
sists of a wire-drawing drum fitted with coil guides which project downward from the discharging end of the drum, and in order to permit of the contraction of the inner diameter of the finished coil, and to allow of tieing same they are offset inwardly for the periphery of the drum. These guides being parallel with the axis of the drum, the coil has a uniform diameter from end to end.

911,271. February 2, 1909. CRUCIBLE FURNACE. Edward A. Schwartz, Chicago, Ill., assignor to Kroeschell Brothers Company, Chicago, Ill. An improved form of a tilting crucible furnace used, with oil or gas, as shown in cut. The fuel and air for draft are introduced into the combination chamber near its base and the pot gases of combination are given a gyratory motion in ascending to cause them to envelope the crucible supported in its chamber. The furnace has an inlet port for



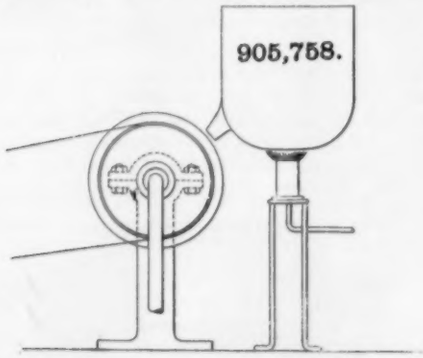
the burning gases which leads them into the base of the furnace at a tangent through its walls. There are air ducts leading through the wall into the base to discharge into the path of the gases, an air supply conduit communicates with the air channel connecting the air ducts. A nozzle equipped mixing chamber connects with the inlet port and has a branch connection to the conduit. The feed valve of the burner discharges into the mixing chamber nozzle.

911,578. February 9, 1909. ELECTROPLATING APPARATUS. John T. Daniels, Newark, N. J., assignor to Hansen Van Winkle Company, Newark, N. J. A tumbling barrel or drum used for electroplating of the usual type, but having a new and improved material for its perforated sides. This inventor has discovered that sheets or panes of celluloid, xylonite, or other material composed of



nitro-celluloise, mixed with other substances, proves an excellent substitute for the material previously employed in the construction of the perforated sides of the drum.

905,758. December 1, 1908. Process of Manufacturing Thin Sheets, Foil, Strips or Ribbons of Zinc, Lead or Other Metal or Alloy. Edward H. Stange and Charles Albert Pim, Staple Inn, London, England. This invention covers an improved process by means of which zinc, lead or other metal of melting



point low enough to be so treated can be continuously, quickly and economically formed into very thin and even sheets, foil, strips or ribbons of even width and thickness and as free from flaws, or other imperfections, as possible, and in a condition capable of being acted upon chemically. The metal is maintained in a molten condition in any suitable receptacle and is passed out through a proper sized outlet or outlets onto a moveable cooling surface.

909,274. January 12, 1909. Process of Coating with Metals. Carl H. Greene, New Castle, Pa. By this process metallic materials or objects can be coated with a metal or a combination of metals of a character suitable to resist external influences. A sheet of iron or steel is cleaned in a pickle bath. A bath is prepared, consisting of 90% metallic oxide, of the metal or metals used for coating and 10% of an inert substance, as clay. The sheet is brought into contact with the bath, dipped in if both sides are to be coated, and brushed with it if only one side. The sheet is then heated to 600° to 1,000° F. with exclusion of air. By this means the metallic oxide is reduced and its metal or metals deposited on the sheet.

912,645. February 16, 1909. Alloy. Warren G. Black, St. Louis, Missouri. A new and useful alloy adopted for bearings as journal and shaft bearings. The alloy consists of copper, 50 to 60 per cent.; iron, 40 to 50 per cent.; nickel, 4 to 6 per cent.; lead, 6 to 15 per cent., and aluminum, ¼ of 1 per cent. to ½ of 1 per cent. To make 100 lbs. of this mixture, proceed as follows: Melt 40 lbs. or iron, then put 4 lbs. of nickel into the molten iron, then add 50 lbs. of copper and about 4 oz. aluminum. Stir the mixture and add 6 lbs. of lead, give a thorough stirring and when hot enough, pour into ingots.

Associations and Societies

DIRECTORY OF AND REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

AMERICAN BRASS FOUNDERS' ASSOCIATION.

President, Charles J. Caley, New Britain, Conn.; Treasurer, John H. Sheeler, Philadelphia, Pa.; Secretary, W. M. Corse, Detroit, Mich. All correspondence should be addressed to the Secretary, W. M. Corse, 123 Palmer Avenue, East, Detroit, Mich. The objects of the Association are for the educational welfare of the metal industry. Annual convention with the American Foundrymen's Association the latter part of May each year in succession of cities, as invited. The 1909 Convention will be held in Cincinnati, Ohio, May 18-20.

Secretary Corse reports the following new members: The Detroit Testing Laboratory, Detroit Mich., Prof. J. W. Richards, Lehigh University, South Bethlehem, Pa.; Albert McDonald, superintendent, Metric Metal Works, Erie, Pa., and the National Tube Company, Kewanee Works, Kewanee, Ill.

The association is making an effort to interest the members in the appointment of a committee to compile standard methods of brass analysis at the convention. The secretary has received an offer of co-operation from Mr. Stratton of the United States Bureau of Standards, who is to send a representative to Cincinnati to aid the association committee. The secretary has also suggested the appointment of a co-operating committee from the American Chemical Society.

THE FOUNDRY AND MANUFACTURERS' SUPPLY ASSOCIATION.

President, F. N. Perkins, Freeport, Ill.; Treasurer, J. S. McCormick, Pittsburgh, Pa.; Secretary, C. E. Hoyt, Chicago, Ill. All correspondence should be addressed to the Secretary, C. E. Hoyt, Lewis Institute, Chicago, Ill. The objects of the association are for the commercial and technical education of the iron and metal industry. Annual Exhibition and Convention with the American Foundrymen's Association, latter part of May each year in a succession of cities, as invited. The 1909 Exhibition will be held at Cincinnati, Ohio, the week of May 17th.

Secretary Hoyt has issued the following statement:

To the Members:

Pursuant to the call of President Perkins, the executive committee of the association met at Cincinnati, Ohio, Feb. 5-6, 1909, for the purpose of perfecting plans for the coming convention in May. The following members were present: F. N. Perkins, J. S. McCormick, J. S. Smith, John Hill, E. J. Woodison, George R. Raynor, U. E. Kanavel, George H. Wadsworth, C. E. Hoyt, E. A. Pridmore.

At the morning session, Feb. 5, 1909, Mr. L. L. Anthes, president, and Dr. Richard Moldenke, secretary, of the American Foundrymen's Association, met with the committee. The following plans were agreed upon:

Admission.—A charge of 25 cents shall be made for general admission. Season tickets will be sold at the registration desk for $1.00. The secretary was authorized to purchase season tickets for duly accredited members of the press and of the local entertainment committee. There will be no free list.

Exhibit Space.—The charge to members for space shall be as follows: Ground floor, with booth railings, 50 cents per sq. foot. Second floor, with booth railings, 35 cents per sq. foot. Temporary buildings without railings, 35 cents per sq. foot. A bonus of $10 will be charged for all corner booths.

Light and Power.—As has been previously announced, the buildings and light are provided by the Cincinnati committee free of charge. Individual motors will be used by the exhibitors needing power. The building is wired for direct current 110-220 volts. An air compressor will be installed for those needing compressed air.

Application for Space.—We enclose blueprint (scale, 1" equals 20') showing first and second floor plans of music hall. The extent of the temporary building will be decided on after we learn of the exhibits to be provided for in that space. We desire that all members send in their application for space at once, so that we can provide for their wants. We have received many inquiries from parties desiring space, and the number of these we will be able to provide for will depend largely upon the amount of space our present members shall require. In making application for space, state how much space you will want, what the nature of your exhibit will be, if you will need power, what kind and how much you will need. And give approximate weight of the largest piece of freight you will ship.

Awarding Space.—The question of awarding space was placed entirely in the hands of the secretary, by the executive committee.

President Perkins has written the following letter to Secretary Hoyt:

Cleveland, Feb. 15th, 1909.

My Dear Mr. Hoyt:

My attention has been called to some unfavorable comments on the recent ruling of our trustees regarding making a charge for admittance to our exhibit in Cincinnati during the week of May 17, 1909. As you know, this ruling was agreed to after consulting the officers of the American Foundries Association and others, and I am of the opinion if your foundry friends and others interested were familiar with our enormous expense in maintaining the organization and exhibit, they will not object to paying $1.00 for season ticket or 25 cents for single admission.

In this connection it is fitting to say that the two exhibits held have cost our members over $70,000 each direct and indirect, and we have been compelled to assess our members after each meeting, to pay legitimate expenses. There is a grave question whether results warrant the expense, and it must be plain to a careful observer if we do not get relief from some source, the heavy expense will disrupt our association. However, it is our belief that the exhibit tends to increase interest, as well as a membership in the allied association; that the educational features are well worth the slight charge. It will also have the tendency to eliminate the miscellaneous crowds attending former exhibits, giving those interested a much better opportunity to inspect features of interest. In making this charge we are following the custom of all similar exhibits the country over, and every indication points to one of the largest exhibits in Cincinnati ever held, more space having been selected at this date than ever before. This, together with the elaborate hospitalities offered by the local committee, I hope will give every attendant full value for his money.

The Foundry and Manufacturers' Supply Association.
F. N. Perkins, Pres.

NATIONAL ASSOCIATION OF BRASS MANUFACTURERS.

President, Joseph H. Glauber, Cleveland, Ohio; Commissioner, William M. Webster, Chicago, Ill. All correspondence should be addressed to the Commissioner, William M. Webster, 1110 Schiller Theatre Building, Chicago, Ill. The objects of the Association are to promote in all lawful ways the interests of firms engaged in the manufacture of brass goods. Meets every three months. Each meeting fixes the place and date of the meeting to follow, consequently there is no stated place. It has been customary for the Association to hold its Annual Meeting in New York City, but the last meeting was held in Philadelphia. The Semi-Annual Meeting is generally held at Atlantic City or some other Sea Coast town.

The association held their quarterly meeting March 15, 16, 17 at the Hotel Jefferson, St. Louis, Mo. The list committee, who have the question of altering, revising and adopting new form of lists, met prior to the regular meeting.

ASSOCIATED FOREMEN PLATERS.

This Association is being organized, and held its first meeting March 6, 1909, at the Hotel Chelsea, 222 West 23d Street, New York City. A committee has been appointed to select a name and draft a constitution. Over forty foremen platers from all parts of the United States and Canada have sent word that wish to join the Association. Charles H. Proctor, Arlington, N. J., is Chairman; Percy S. Brown, Secretary. Correspondence should be addressed to the Secretary, Percy S. Brown, 906 Summit Avenue, New York City.

A very enthusiastic preliminary meeting of the foremen platers was held on the afternoon of March 6 at the Hotel Chelsea, 222 West 23d street, New York. While the total attendance numbered 18, letters were received from over double this number of platers stating their interest in the proposed organization and one Western plater showed his enthusiasm by sending $10.00 for the cause. The chairman, Charles H. Proctor, in delivering his address, spoke of the value of such an association of foremen platers and how he hoped that the association would grow to such an extent that a laboratory might be established in New York City for the purpose of research work. After the reading of letters from those who were unable to attend on account of their distance of residence, each plater mentioned their ideas on the purposes of the society. There was a general discussion by all on the various plans and scope of the society and finally resulted in the appointment of a committee by the chair consisting of B. W. Gilchrist, L. J. Krom, Hugh Baxter, the chairman and secretary of the association and two other members to be appointed by the chair to select a name and draft a constitution, their report to be submitted within a few weeks. The regular meeting then adjourned and was followed by an informal talk. The following were present at the meeting.

Charles H. Proctor, Otto Dennewitz, John J. Fannon, William McConnell, Frank Duffy, Hugh Baxter, Royal F. Clark, Herbert W. Cummings, H. H. Smith, B. W. Gilchrist, Nathan Emory, J. F. Meinke, L. J. Krom, Palmer H. Langdon, G. W. Cooper, T. A. Trumbour, E. B. Davidson, Percy S. Brown.

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION.

President, Fred L. Eberhardt, Newark, N. J.; Treasurer, W. P. Davis, Rochester, N. Y.; Secretary, P. E. Montanus, Springfield, Ohio. The objects of the association are to promote the interests of the machine tool builders in the direction of good fellowship and the liberal discussion of subjects relating to the improvement, standardization of parts and methods of manufacturing machine tools. The association meets at the call of the Executive Committee. Annual meeting held in New York City. Semi-annual meeting will be held in May in Milwaukee. Correspondence should be addressed to the Secretary, P. E. Montanus, of Springfield, Ohio.

A special meeting of the National Machine Tool Builders was held March 1 at the Hotel Imperial, New York City. After discussing business conditions, of the reduction in the prices of steel, the association adopted two resolutions, which were as follows:

Resolved, That it is the sense of this convention that we favor the creation of a permanent tariff commission for the following purposes:

1. The collecting and intelligent, thorough and unprejudiced study of tariff facts.
2. The preservation and promotion of our home market and the development and enlargement of our foreign trade.
3. The accomplishment of this by reciprocal trade agreements, based on maximum and minimum schedules.
4. The adjustment of the tariff schedules so that they shall affect all interests equitably.

Whereas, There have been certain reported reductions in prices, temporary or otherwise, on certain raw materials entering into the construction of machine tools; and

Whereas, The cost of these materials constitutes only a minor percentage of the total cost of machine tools; and

Whereas, Even should these reductions prove to be permanent, little benefit can accrue to the manufacturer for some time to come; and

Whereas, There has been a marked increase in the total cost of machine tools, due to improved designs, necessity for new equipment to meet the rapid advance in modern shop practice, increased manufacturing and selling burden; and

Whereas, The percentage of margin in the machine tool industry is not adequate nor does it compare favorably with percentages of profit realized in other lines of manufacture; therefore be it

Resolved, That it is the sense of this meeting that there is nothing in present conditions to warrant a change in machine tool prices, unless such change should be toward a higher level.

Owing to the absence of the secretary, P. E. Montanus, who is in Europe, the association did not decide the exact date that it will meet in May in Milwaukee, Wis.

AMERICAN PLATERS' ASSOCIATION.

Dr. Richard Moldenke, Secretary of the American Foundrymen's Association, is instrumental in forming an American Metal Platers' Association at the coming convention of the American Foundrymen's Association, Cincinnati, the week of May 17. All manufacturing platers and manufacturers and sellers of Platers' Supplies, who would be interested in such an association should write to Dr. Richard Moldenke, Watchung, N. J.

ITEMS OF INTEREST TO THE INDIVIDUAL.

LEWIS J. ATWOOD.

LEWIS J. ATWOOD.

Lewis J. Atwood, president of the Plume & Atwood Manufacturing Company, and one of the best known of Waterbury's manufacturers, died Feb. 23 at his home, 260 Grove street, after an illness of two weeks.

Lewis John Atwood was born in Goshen, Conn., April 8, 1827, one of nine children, of whom now only one, Mrs. Cornelia Read, of Providence, survives. Besides his sister and his widow, who was Miss Elizabeth S. Platt, of this city, their only son, Irving L. Atwood, and two grandsons, Lewis I. Atwood and Carlton F. Atwood, survive.

Mr. Atwood went to Waterbury in 1845. When there but a short time Mr. Atwood started the manufacture of buckles and buttons with Samuel Maltby, of Northford, but owing to lack of capital they were unable to continue.

In 1869 Mr. Atwood became a stockholder of the Holmes, Booth & Atwood Manufacturing Company, whose name was later changed to the Plume & Atwood Manufacturing Company. This concern was for years conducted under his management, both the mills at Thomaston and the factory in this city.

Mr. Atwood took the office of secretary of the company in 1864 and in 1890 he became president, an office which he continued to hold to the time of his death. At one time Mr. Atwood was one of the owners of the present American Ring Company plant. Mr. Atwood had a decidedly mechanical turn and had taken out many patents for improvements in coal oil burners, lamps and lamp fixtures, enabling his company to take a leading place in manufacturing this line of goods. An important invention of his was the process known as "cabbaging," being the forcing together by a hydraulic press of scrap metal, preparatory to remelting. Before Mr. Atwood improved the remelting process the compactness of the whole was secured by pounding the metal with sledges into a cast iron vessel or mortar and was slow and expensive work. The hydraulic press does the work more quickly and better and has been widely adopted.

Mr. Atwood was for years a deacon in the Second Congregational Church, in the affairs of which he took an active interest. He was the chairman of the building committee of the Y. M. C. A., and for five years was the president of the association.

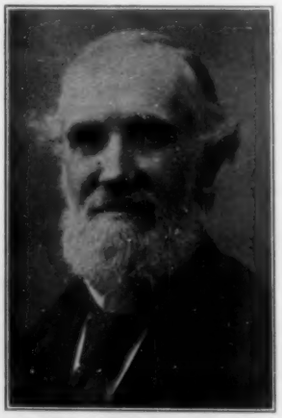
Royal F. Clark, who was formerly foreman plater for the firm of M. C. Lilley Company, Columbus, Ohio, has severed his connection with that company and has accepted a position in the same capacity with the Thomas J. Dunn Company, manufacturing jewelers, of New York City.

L. A. Crandall, late vice-president of the Detroit Foundry Supply Company, has severed his active connection with that firm to accept a position with the J. W. Paxson Company, of Philadelphia, Pa., as manager of their Western branch, where a full line of foundry equipment and supplies will be carried in stock for prompt shipment. The "Deacon," as most of his friends know him, will be very glad to be remembered in his new position.

FAMOUS BRITISH METALLURGIST.

A REMARKABLE CAREER.

The death has taken place at Birmingham of Dr. George Gore, F.R.S., LL.D., at the age of 83. Dr. Gore, who must be well-known to many Americans through his works, has had a remarkable career. He worked as an errand boy until 17 and for the next four years as a cooper, working 14 hours a day and studying scientific books at night. His inventive genius developed two small machines for covering copper wire with cotton, and he also improved the medical galvanic apparatus. He discovered explosive antimony which becomes red hot with slight frictions. Another discovery was a liquid by means of which nickel can be deposited as a bright white metal. This was patented in America in 1869 by Dr. J. Adams, and is still extensively known as Gore's Solution. A small book on "The Principles and Practice of Electro Deposition" had a great sale in England and America.



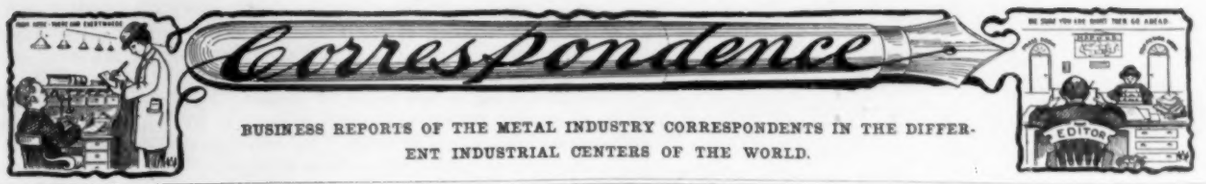
DR. GEORGE GORE.

An invention of special interest to foundrymen was a small gas furnace produced in 1863 for the melting of cast iron without the aid of a blast of air. This apparatus has been extensively used for experimental and technical purposes. Most of his discoveries related in some way to metals. For various researches of this character he was elected a Fellow of the Royal Society in 1865. A remarkable number of discoveries have led to practical results in the treatment of the higher metals and in 1877 he published a comprehensive text-book on the "Art of Electro-Metallurgy," which has ever since been highly valued by scientific experts. About this time the University of Edinburgh conferred the honorary degree of LL.D. in recognition of his abilities as a discoverer, teacher, and general expositor of science.

In 1891 he was granted a Civil List pension, but declined a knighthood which was also offered to him. Birmingham metallurgists agree that his long series of researches have been of the greatest possible value to the various metal trades which find their natural centre in this city. Probably no chemist was more frequently consulted by practical metallurgists and he was in almost constant demand by university professors and experts in the several departments of metallurgy.

E. Blassett, Jr., who was formerly in charge of the plating department of Peck, Stow & Wilcox, at Southington, Conn., has accepted a position as foreman plater with the Secor Typewriter Company, of Derby, Conn.

Julian B. Holly has invented a coffee percolator, for which he has been granted a patent, No. 913,293, February 23, 1909. Mr. Holly has assigned his rights to the Bristol Brass Company, of which he is manager, at Bristol, Conn.



BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS IN THE DIFFERENT INDUSTRIAL CENTERS OF THE WORLD.

WATERBURY, CONN.

March 8, 1909.

With spring at hand, the inauguration over and most of the annual meetings held, there is noticeable a decidedly healthier tone in all local industrial affairs and indisputable evidence of increased activity and confidence on the part of the manufacturers. To-day will see small increases in the number of employees in nearly all the watch and brass manufacturing plants and mills and a slight increase in the number of hours in the regular schedules of many of the shops.

Within the past few days a careful inquiry into the prospects and views of the heads of local manufacturing concerns has brought out the fact that all seem sure of a steady growth of business, while some already report a marked improvement. The records of the first two months of this year as compared with the corresponding months of last year in a majority of cases show a large gain in favor of this year.

One of the most encouraging signs is the increase in business for smaller shops, many of which are running full time with full forces. While this growth of business in the lines controlled by the American Brass Company is not so marked, there is every evidence that the plants of this concern in Waterbury, Ansonia and Torrington are to be kept fairly busy for many weeks and may soon feel the necessity of making considerable additions to the help of some departments. The scarcity of stock in all parts of the country is being felt and occasional hurry orders are received in various lines indicating that in some places there is pressing need of new supplies of materials manufactured here.

In the Scovill Manufacturing Company's plant there is great activity and this concern is already anxious to complete the construction of new factories to relieve conditions which are becoming more congested each month and will be somewhat of a handicap as business increases. Day and night gangs are employed on full time in many departments of this concern, of the Chase Rolling Mill Company and of the Waterbury Manufacturing Company.

Tubing seems to be in great demand and the small and large manufacturers of these goods are busy keeping up to orders.

In the past few days the watch business has shown a slight improvement. Slight increases have been made since the beginning of the month in the New England Watch Company and the Waterbury Clock Company forces, and both foreign and domestic orders are increasing. In the pin and wire factories and the novelty, automobile and smaller metal manufacturing, business has gone steadily forward since election. Those plants which turn out parts or trimmings for automobiles are kept busy filling rush orders and are hardly able at this season to get stock ahead. This is one of the best signs of the times to come, local authorities think.

While confidence is in evidence everywhere, there is no tendency here to rush matters and no sudden boom is looked for in any line. Copper prices, while low, have not seemed to encourage heavy buying, but the reports of the past few days have greatly strengthened the safe feeling here. Market manipulators are blamed for retarding an earlier improvement in this respect, but the brass interests have no desire to force copper prices up. The fact that the Westinghouse people have undertaken a $5,000,000 contract is gratifying news, as well as the steel cut, and the spring building boom which reports indicate will sweep a large part of the country will not find the Naugatuck valley interests idle. Material for building and electrical uses, besides such parts as are made here for railroad cars and other equipment are being turned out to meet a demand that is expected to furnish business throughout the dull summer season for large forces.

At the annual meeting of the American Brass Company held Tuesday, February 23, all the reports were satisfactory, and the company's stockholders and directors felt satisfied with the outlook. The local plants of the company are being kept busy with nearly the normal force in all departments, and despite the fact that large sums have been laid out on improvements in buildings and machinery and the acquisition of valuable factory sites for future development during the past year, the corporation has passed through the trying period so as to be in splendid condition for the problems of the new year. Reports from the New York representatives of the company and from its foreign branches were excellent.

F. B. F.

PROVIDENCE, R. I.

March 8, 1909.

The Gorham Manufacturing Company of this city is to make the bronze statue of Rear-Admiral John A. Winslow, commander of the Kearsarge, which is to be placed in two months at the entrance of Memorial Hall, the Massachusetts State House at Boston. The Executive Council was authorized last year to secure a full-length statue of Admiral Winslow. The model has been accepted and the work will soon be completed at the Gorham factory. The designer is one of the three pupils of the aged sculptor, Thomas Ballyn, and is his son-in-law.

The sterling silver service recently completed by Reed & Barton for the battleship Minnesota is the most notable in many respects of any yet designed. The style is that of the French school, of the transition or later Louis XV period and is composed of 42 pieces. The total weight of the punch bowl is over 1,000 ounces. The service throughout is radically different from anything previously made and will bear comparison with the best products of the silversmith's art.

The Alpha Jewelry Company has filed articles of incorporation with the Secretary of State. The company will establish a manufacturing jewelry business in the city of Providence. The incorporators are Fred M. Swartz, Nathan Horowitz and Richard E. Wildprett. The capital stock is $9,000.

More than 500 manufacturing jewelers from all parts of New England attended the mid-winter banquet of the New England Manufacturing Jewelers' and Silversmiths' Association at Infantry Hall on the evening of Saturday, Feb. 13. George H. Holmes, treasurer of the George H. Holmes Company, of this city, acted as toastmaster. The meeting was called to order by President Harry Cutler. Among the speakers were Senator William Borah, of Idaho; Senor Gonzalo de Quesada, Cuban Minister to the United States; Rev. S. Parks Cadman, D.D., of Brooklyn, N. Y., whose subject was "Abraham Lincoln from an Englishman's Standpoint"; Percival D. Oviatt, of Rochester, N. Y., Secretary of the National Lithographers' Association; Governor Aram J. Pothier and Mayor Henry Fletcher. The gathering sent to President Gomez of Cuba a cablegram expressing a hope for closer commercial relations with Cuba.

The National Manufacturing and Metal Company has been organized in this city. The incorporators are John B. Hartnett, David Rosenberg and John Mueller. The capitalization is $25,000. The company will manufacture castings and fixings of all sorts.

Mayor Henry Fletcher, who is treasurer of the Fletcher, Burrows Company, manufacturing jewelers, acted as toastmaster at the great "boom banquet" held at the State Armory, Feb. 24. Twenty-five hundred business men took part in the festivities, which had for their object the coalescing of the business forces of the city for a movement to advance the interests of Providence and Rhode Island.

The Master Sheet Metal Workers' Association has elected the following officers: President, F. W. Morse; vice-president, Robt. J. Braley; secretary, Frank Davis; treasurer, Warren Magoon. A banquet will be held this month. It is expected that the national officers will attend the affair.

The month of February was an encouraging one for the manufacturing jewelers of this section. The month is not among the rush months of the year as a rule, and this year was no exception, but business held up well in comparison with former years.

E. S. U.

BUFFALO, N. Y.

March 8, 1909.

The metal trades of this city are recovering from a period of comparative inactivity and approaching what bids fair to be a busy season. The recovery has been gradual in the last six months, but the state of trade is far from normal again. The metal business is no small factor among the city's industries, and the depression which resulted in curtailment of expense and shop forces was felt to a marked degree.

Heads of the various brass foundries, plating shops and fixture factories in the territory profess to see a more hopeful outlook for the present year over 1908. They have had a fairly busy winter, and February was a month of more than the usual activity over the last year.

A number of the brass foundries are located in close proximity to the waterfront and are dependent to a certain extent upon the lake trade, which is no small part of their annual business. The season of 1908 was a poor one for the lake men, and not all the boats were in commission, so that the amount of repairs fell below normal. As the season of 1909 approaches the metal shops are receiving orders and preparing for a fairly active season. There are over 100 of the modern lake freighters, a score of which are ships of 10,000 tons' capacity, in ordinary here, and they will all be fitted out in the present month and in April, when navigation opens. The engineers are being signed now. This work calls for a lot of brass fixings for boilers and engines, such as valves, cocks, etc.

The labor situation in the metal trades is satisfactory, and there has been no trouble in over a year. While there is no scarcity of mechanics in this market, the men have not had their wages cut, and conditions are agreeable. The Lackawanna Steel Company announced a cut of twelve per cent. in wages of its mill hands last week, and this was not the most pleasing news.

The manufacturing jewelers seem to be prospering. One big house recently moved to larger quarters, which necessitated the employment of additional help, and another put an extra story on their building.

Manufacturers of brass novelties and fixings had exhibits at the Automobile Show, held the week of March 1, in Convention Hall, and some had space at the Power Boat and Sportsmen's Show, which held forth in the same place the week of March 8.

The first annual Industrial Exhibition show, held here last December by the Manufacturers' Club, cleared $10,000. Nearly every local industry in our lines was represented, and will be at this year's show, arrangements for which are now under way. Many of the manufacturers propose the erection of a permanent exhibition building on the site of the Chippewa market, but the scheme is still in the air.

There ought to be a boom in the metal trades this summer when the building work sets in. Contracts for big structures have been let, and the work will begin as soon as weather conditions permit.—F. M. A.

CLEVELAND, OHIO

March 8, 1909.

A number of Cleveland jewelry and metal working concerns are preparing to enter exhibits at the Cleveland Industrial Exposition to be held in this city June 7-19. Among the concerns already entered are the Webb C. Ball Watch Company, the Brunner Bros. Jewelry Company, The Acme Brass Company, the Bishop & Babcock Company, makers of brass goods; Homer Commutator Company, the Warner Swasey Company, builders of brass working machinery; Reister & Thesmacher, metal workers, and many others.

Plants of the Acme Brass Company, the National Acme Manufacturing Company and several other concerns closed during the funeral services of the late Carl F. Drury, secretary of the Cleveland Foundry Company, who passed away after a brief illness. Mr. Drury will be greatly missed in the brass manufacturing business in this city.

The Galley Company, jewelers, with offices in the Schofield Building, filed a deed of assignment to David E. Green during the past month, in the insolvency court. They give their assets at $1,000 and their liabilities at $3,000. Poor business conditions are given as a cause of the assignment.

The Brookside Brass and Manufacturing Company has increased its capital stock from $10,000 to $20,000 and contemplates enlarging its scope of operation. Officers of the concern say the outlook for a good year in the brass foundry business is very good.

Three and a half miles of copper wire were stolen by thieves from the Bell Telephone Company in the vicinity of this city within one week recently. The wire was stripped from the poles and sold to junk dealers, it is thought. Police have been unable to catch the thieves.

Architect Arnold Brunner, of New York, who designed and who is overseeing the erection of the new federal building in Cleveland, announced recently that he has about completed plans for elaborate grills and fences of bronze for the new monumental building, which is being completed by the John Gill & Sons Company, of Cleveland. It is planned to have two great bronze lions to stand at the front portals of the handsome building.

The Royal Brass Company is fighting Rev. Patrick Farrell, of the Immaculate Conception Church at Superior avenue and East 41st street, who has sued to prevent the company from locating a brass foundry near the place of worship. The company maintains that the legal title to the church buildings is not held by Father Farrel, but by the Cleveland Catholic diocese and that he has no right to bring suit. The company had planned to make a large addition to its plant before halted by the suit.

At the annual meeting and banquet of the Cleveland branch of the National Metal Trades Association held at the Colonial Hotel March 4, L. D. Weaning was chosen president for the ensuing year, W. C. Bruce, vice-president, and C. J. Snow, treasurer. The nominating committee consisted of W. H. Avery, A. F. Schroeder, I. C. Sparrow, E. E. Allyne and H. H. Hammond. George Bartol made the report of the retiring president and Rev. Paul F. Sutphen gave an address on "Patriotism." About 100 members of the association, which is in a very flourishing condition in Cleveland, were present at the function. S. L. M.

BIRMINGHAM, ENGLAND

February 15, 1909.

The old Birmingham firm of Hart Son & Peard has just completed a commission from the government of Brazil for three pairs of decorative bronze doors intended for the principal entrance to the new State Library of Brazil, now being erected at Rio de Janeiro at a cost of over £500,000. The order was secured for Birmingham in competition with German and American firms, the drawings being selected for the merit of their design in spite of the quotations exceeding other estimates.

Some contrasts between foundry practice in Great Britain and in America were brought out during a recent discussion of the British Foundrymen's Association, Birmingham branch, and the Birmingham Metallurgical Society, Mr. R. Buchanan (president of the Birmingham Branch of the Foundrymen's Association) was in the chair and the discussion was opened by Professor T. Turner, M.Sc., who gave an illustrated lecture on "Brass Founding." Having described a properly equipped and arranged modern brass foundry, the lecturer said that the majority of brass foundries in Birmingham would never have been designed as they now existed. The fact was that they had, like Topsy, "jest growed." Among the points dealt with by Professor Turner were the construction of crucibles and furnaces, the selection of metals, and the principles of combination in alloys of the brass and bronze series as formulated in the equilibrium curves. He pointed out the waste of fuel caused by the use of furnaces too large for the pot. It was often more economical to change the furnace than to use the same furnace for different sized pots. The space between the crucible and the side of the furnace should not exceed six inches.

The Birmingham Metallurgical Society founded seven years years ago has already made a good position for itself among those engaged in the metal industries. Its fifth annual dinner which took place recently was attended by eminent metallurgists not only from Birmingham but also from London, Newcastle and other centres. The fact that England, though it had had an iron industry for more than 350 years, had been outstripped by America and Germany, was adduced as showing the importance of a scientific knowledge of metallurgy to any country that desired to hold its own in such industries.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

The Joseph Dixon Crucible Company, Jersey City, N. J., reports that their crucible business for February of this year was 84 per cent. great than that of 1908.

The Turner and Seymour Mfg. Company of Torrington, Conn., manufacturers of brass and other metal goods, report that they are building an addition to their foundry, which will be used for a molding room.

The brass foundry business formerly conducted by Thomas Paulson, Brooklyn, New York, will be continued under the name of Thomas Paulson and Son. This firm are the sole manufacturers of Hecla Anti-Friction Bronze.

H. W. E. Sewell, formerly with the Syracuse Aluminum and Bronze Company, Syracuse, New York, has accepted a position as night foreman with The Eclipse Foundry Company of Detroit, Michigan, manufacturers of aluminum automobile castings.

The Shoe Hardware Company, Waterbury, Conn., are building a foundry for the manufacture of aluminum castings, used principally in the production of rubber goods. The company will also do outside work.

The Caskey Valve Company, 99 John Street, New York, the incorporation of which was noted in our February number, announce that they will manufacture hydraulic valves, not "blow-off" valves as reported.

The Delamothe Company, Spokane, Wash., who are makers of metallized novelties and general platers, are about to put on the market a line of metal electric portables and lamps. The Delamothe Company would like to hear from manufacturers of this material in an unfinished state.

The American Export Syndicate, Inc., 338 Broadway, New York, is issuing circulars, setting forth its plan of an exhibit of American goods in London, England and Berlin, Germany to be opened later in the year. All manufacturers who would be interested are asked to correspond with the American Export Syndicate.

The Virginia Metal Manufacturing Company of Portsmouth, Va., has been awarded the contract for the general sheet metal work on the double set of officers' quarters in the Marine Barracks Reservation of the Norfolk, Va., Navy Yard, the work being well under way. R. H. Richardson & Son of Hampton, Va., are the general contractors.

The plant of the Roberts Chemical Company, Niagara Falls, N. Y., is now being operated by the Niagara Alkali Company under a lease. The Niagara concern is prepared to furnish caustic potash in liquid, solid or broken form for the use of metal workers and platers of the same quality as that formerly supplied by the Roberts Chemical Company.

The Mitchell and Van Meter Company of Pottsdam, Pa., manufacturers of plumbers' brass and iron material, are building an addition to their brass foundry. This addition will be 40 by 84 feet and will be used for a molding room. It will be equipped with the most up-to-date molding machines and furnaces. This will enlarge their foundry to about double its present capacity.

The Indian Aluminum Company, Limited, Madras, India, report that they have had so much aluminum work to attend to during the past year that they have not had time to do any other kind of metal work. They have found it necessary to considerably increase the size of their workshop and have placed orders with English manufacturers for about $50,000 worth of drawing presses and spinning lathes.

John Toothill's white metal rolling mill, which was moved last year from New York to Rochelle Park, N. J., is now in fine shape to take care of orders for anything in the line of casting, rolling and refining sheet block tin and Britannia metal. With the increased facilities at the new plant it is possible to fill orders for any ordinary material the same day the orders are received. Mr. Toothill reports a good year just past and bright prospects for 1909.

The METAL INDUSTRY has learned from an authoritative source that the efforts which are being made to consolidate all the important manufacturers of parting compounds are likely to reach a successful conclusion. Negotiations have been in progress for a month or more and numerous conferences have been held in New York City. It is reported that many consumers of parting compounds favor the change, as it would tend to eliminate some of the small, irresponsible dealers who have had a demoralizing influence on the trade.

The METAL INDUSTRY learns from a reliable source that there is no truth whatever in the rumor current in brass mill circles, for the past few months, concerning Messrs. C. S. Morse and F. J. Loomis, superintendent and engineer for the Tube Mill Department of The National Cable and Conduit Co., Hastings-on-Hudson, New York. Report had it that these gentlemen were about to sever connections with this firm and become identified with interests seeking to establish a brass and copper mill in the vicinity of Cleveland, Ohio.

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until 10 o'clock a. m., March 23, 1909, and publicly opened immediately thereafter, to furnish at the navy yard, Mare Island, Cal., a quantity of naval supplies, as follows: Sch. 966: Ammeters, voltmeters. Applications for proposals should designate the schedules desired by number. Blank proposals will be furnished upon application to the navy pay office, San Francisco, Cal., or to the Bureau. E. B. Rogers, Paymaster-General, U. S. N.

The Metal Manufacturing Company, 1826 Land Title building, Philadelphia, recently organized, will engage in the foundry supply business, and will carry a large stock of metals and alloys for prompt shipment at all times. This will include ferro-manganese, metallic manganese, ferro-silicon, manganese copper, ferro-vanadium, ferro-chrome, silica-spiegel, spiegeleisen and manganese oxide. A full line of foundry supplies will also be carried in stock. B. D. Smoot, who has had a wide experience in the foundry supply trade, is general manager.

The Electrical Maintenance and Repair Company, Newark, N. J., are putting on the market a new storage battery called the "Double Cross," which is designed to meet the demand for a cheap and reliable battery having a capacity up to 100 ampere hours. These batteries are especially suited for grouping in series or parallel sets, a feature that is particularly valuable in cases where an increase in capacity is desired. They have non-corroding clamp terminals, and are put up in glass or rubber, for stationary or portable use. They are packed in unusually strong battery boxes.

The Fairfield Aluminum Foundry Corp. of Fairfield, Conn., have recently moved into their new addition to their main factory. The new building is connected to the old by a room 25 by 40 feet, used for a metal store room. The foundry is 120 by 60 feet, and has also a chipping and cleaning room 20 by 30 feet and an absolutely fireproof pattern vault 20 by 24 feet, together with a new office 14 by 24 feet. They have also installed a new 20 H.P. gasoline engine, 12 new melting furnaces and a large core oven. With these improvements the company now has a capacity of two tons of aluminum castings per day.

The Philadelphia Roll and Machine Company of Philadelphia, Pa., manufacturers of chilled and sand rolls and rolling mill equipment, have had considerable difficulty in operating their breaking machine used in breaking up old cannon used in their rolls. The neighbors of the plant have complained that the heavy vibrations from this machine cause considerable damage to foundations, windows, and delicate machinery. The Roll Company use these cannon because their excellent composition makes them valuable for mixing with the roll material, and this accounts for the superior qualities of their rolls.

The Standard Rolling Mills, 363 Hudson Avenue, Brooklyn, N. Y., report a brisk business. They are rollers of Britannia metal, used largely by manufacturers of silver plate. Also they roll black metal, antimonial lead sheet and white metals generally. They also do spinning and transact quite a business with manufacturers of soda water apparatus. Other branches of their plant are silver solders for manufacturing jewelers and silversmiths, white metal and antimonial lead castings, which are used in making metal novelties. The company has increased its equipment considerably to satisfy the demand of its increasing trade.

David S. Hawkins, a mechanical engineer of many years' experience, has opened an office as consulting engineer at 1021 Rose Building, Cleveland, Ohio, where he will be ready to offer his professional services to the mechanical branches of the metal industry. Mr. Hawkins is a graduate of the Massachusetts Institute of Technology, and has had fifteen years' experience as draftsman, designer, estimator, foundry engineer and representative with The General Electric Company, The Pennsylvania Railroad, Pope Motor Carriage Works, Pratt & Whitney Company, Westinghouse Electric and Manufacturing Company Foundries, and the J. D. Smith Foundry Supply Company.

M. J. Hannifin, the organizer and former president of the Manufacturers Equipment Company, of Chicago, and A. V. Hannifin, their former sales manager, have severed their connections with that company and are manufacturing the same complete line of pneumatic chucks and special machinery as that company, together with their pneumatic clutch countershaft, under the name of The Hannifin Manufacturing Company at Chicago. The company reports that Mr. M. J. Hannifin is known as one of the oldest and ablest men of the brass business in the country and that they are very busy and are receiving many inquiries. They look for a good year.

Hoskins Manufacturing Company, formerly The Hoskins Company of Chicago, has opened its new plant and general offices at 453 to 471 Lawton avenue, Detroit, Michigan. Here the company has an extensive factory, new equipment, and enlarged facilities for making and distributing its established line of Electric Furnaces, Pyrometers and Heating Appliances. With the reorganization and increase of capital to $500,000, the management remains the same as before. The officers of the company are: Mr. Hoyt Post, president; Mr. W. W. Talman, vice president and sales manager; Mr. E. F. Hoskin, general manager and treasurer; and Mr. Johnathon Palmer, Jr., secretary. Mr. A. L. Marsh will continue in the capacity of electrical engineer for the company.

The Kato Mfg. Co. of Jersey City, N. J., established 1863, no doubt to-day the pioneers of manufacturers of Artistic Bronzes and Art Metal goods, who have been located in their present plant in Jersey City for the past twenty-nine years, have entered into a 15-year contract with the Draught Bottle Company of America to manufacture all their syphons, and will therefore utilize the best part of their plant for this purpose. They will hereafter make only such staple lines and artistic metal goods as are ordered direct from them. This offers a most favorable opportunity for some enterprising parties to arrange to take up this valuable collection of useful, staple and ornamental metal goods, which could readily be done with the co-operation of the Messrs. Kato, who are both practical mechanics in all branches pertaining to the manufacturing, plating and bronzing of metal goods of the highest grade.

The O. J. Mousette Company, Inc., Brooklyn, N. Y., state that they have recently furnished a number of manufacturing jewelers and smelters of precious metals with Monarch Crushers especially arranged to meet the requirements of these trades, and that they have given very satisfactory results. Among their customers are included the Attleboro Refining Company, Attleboro, Mass.; Almy-Cary Company, Providence, R. I.; Dubois Watch Case Company, Brooklyn, N. Y.; Fahys Watch Case Company, Sag Harbor, N. Y.; Handy & Harmon, Bridgeport, Conn.; Huestis Manufacturing Company, Brooklyn, N. Y.; International Silver Company, Meriden, Conn.; Jewelers' & Silversmiths' Refining Corporation, North Attleboro, Mass.; Kastenhuber & Lehnfield, New York; Louis Kaufman Company, New York; Edward Miller & Company, Meriden, Conn., and the Crown Reserve Mining Company, Cobalt, Ontario.

REMOVALS

The Tri-City Electric Company, formerly located at 405 Brady street, have moved to 119 East 4th street, Davenport, Ia.

The Cleveland Vapor Light Company, formerly located at Cleveland, O., have moved to 835 Greenmount avenue, Baltimore, Md.

Acme Plating and Enameling Company, formerly located at 73 East Erie street, Chicago, Ill., have moved to 93 Orleans street.

Friedelson Bros. & Stoll, silversmiths, formerly located at 145 Centre street, New York City, have moved to 57 Hoyt street, Brooklyn, N. Y.

Chas. L. Bastain Manufacturing Company, manufacturers of metal novelties, formerly located at 76 Illinois street, Chicago, Ill., have moved to 67 Wells street.

The Western Lock and Hardware Manufacturing Company, formerly located at 1118 San Pedro street, Los Angeles, Cal., have moved to 158 N. Main street.

The Cleveland Platers' Supply Company, manufacturers of electric cleaning compound, formerly located at 113 St. Clair avenue, have moved to 1838 Central Avenue, Cleveland, O.

The New York offices of the Metallic Alloys Company and the Western Foundry Supply Company have been moved from 30 Church street to the nineteenth floor at 50 Church street.

The firm formerly known as The Burns, Silver & Co., manufacturers of knobs, brass and bronze castings and brass goods, on February 19, 1909, have changed their name, and in the future will be known as The Burns & Bassick Company, Bridgeport, Conn.

C. W. Leavitt & Company, the well-known importers of magnesium, antimony and other metals and alloys, announce that their offices will be moved in April from 220 Broadway to more commodious quarters in the Hudson Terminal Building at 30 Church Street, New York.

ADNEWS

W. L. Abate, Mt. Vernon, N. Y., invites those interested in finishing brass goods to write for particulars of the manufacturing Chuck.

The Hannifin Manufacturing Company, Chicago, illustrate their air-chuck in this issue and invite correspondence from persons interested in brass-working machinery.

W. S. Rockwell Company, 50 Church street, New York, call attention again to their crucible melting furnaces. Several sizes are carried in stock ready for immediate shipment.

Paul Uhlich, 81 Fulton street, New York, calls attention to his genuine French lacquers, which are used on the finest class

of metal work by some of the leading manufacturers in this country, as well as in Europe.

The Manufacturers' Equipment Company, Chicago, Ill., are designers and builders of up-to-date special tools for the brass manufacturer. They also build a hand-ramming molding machine and the patterns for it. They solicit correspondence. Further particulars found on another page.

C. W. Leavitt & Company, 220 Broadway, New York, are introducing a new allow for metal purifying purposes. It is adapted particularly for use in the deoxidation and desulphurization of various metals. The alloy consists of silicon, 47 to 57 per cent., calcium 15 to 25 per cent., aluminum 2½ to 6½ per cent. Further data may be had by applying to the firm direct.

The National Lead Company, 111 Broadway, New York, is advertising phosphor-tin containing a high percentage of phosphorus. The company also makes practically every kind of lead products and by-products, including sheet lead, babbitt metal, solder, pipe, tin-lined pipe, block tin pipe, trays and bends, bar lead, lead wire, brazing solder, antimonial lead pipe and fittings.

FIRES

The foundry building of the Record Foundry & Machine Co. of Livermore Falls, Me., was damaged by fire on the night of January 20, to the amount of $7,000. The loss was covered by insurance, and the company now report that the building has been repaired and again in operation.

The Wrightsville Hardware Company of Wrightsville, Pennsylvania, manufacturers of builders' hardware, report that the reports of the fire, which occurred at their plant February 19, were largely exaggerated, only the trimming, polishing and core making departments being affected. They have made temporary arrangements to resume work in all departments, and will rebuild immediately.

FINANCIAL

The Indian Aluminum Company, Limited, Madras, India, have issued their balance sheet and directors' report for the year ending September 30th, 1908, and which shows a total gross profit of Rs. 104,955-3-6, of which working expenses absorb Rs. 33,597-8-6, leaving a balance of Rs. 71,357-11-0. An ad interim dividend of 4 per cent. was distributed for the half year ending March 31st, 1908, amounting to Rs. 15,877-14-3. It was decided to appropriate the balance of Rs. 55,479-12-9 for reserve account for premises, machinery, and a dividend of 8 per cent. for second half year, making in all 12 per cent. for the year.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence.

Power and Allen, Inc., New York; to manufacture and deal in jewelry. Capital, $125,000. Incorporators: C. L. Power, R. B. Allen, Thomas A. Power, and F. W. Conill, all of New York.

Standard Oil Company, Augusta, Ga. Capital, $200,000; to deal in metals, ores and minerals. President, A. M. Currier; treasurer, A. S. Bruzzell, and clerk, C. L. Andrews, all of Augusta.

The Burns Manufacturing Company, Valley Falls, R. I.; to manufacture jewelry. Capitalized at $150,000 with Geo. E. Burns, Central Falls, president, and H. R. Thompson, Boston, treasurer.

Daggert Galvanizing and Plating Company, Syracuse, N. Y.; to plate and enamel metal work. Capital, $10,000. Incorporators: Henry S. Daggert, John D. Daggert and Calvin F. Daggert, all of Syracuse.

Enterprise Metal Company, Syracuse, N. Y.; to manufacture metal castings and metals goods. Capital, $25,000. Incorporators: E. B. Van Wagner, C. Van Wagner and P. A. McColman, all of Syracuse.

Hammond Sheet Metal Company, St. Louis; to manufacture sheet metal goods of steel and brass. Capital, $10,000. Incorporators: Cooper D. Hammond, Wm. S. Cox and Charles C. Wheeler, all of St. Louis.

Newark Brass Plate Engraving Company, Newark, N. J.; to manufacture etchings, engrave brass and other metals. Capital, $25,000. Incorporators: J. N. Morehouse, G. L. Reiman, and M. T. Morehouse, all of Newark.

W. H. Stavenhagen Company, Hudson, N. J.; to deal in metal and wooden articles. Capital, $10,000. Incorporators: W. H. Stavenhagen, Weehawken, N. J.; B. L. Strasberger and Albert Pretzfelder, both of Manhattan.

The Macomber Manufacturing Company, Providence, R. I.; to manufacture jewelers' tools and machinery; capital, $25,000. Incorporators: William T. Macomber, William W. Blades and Matthew J. Gallagher, all of Providence.

L. G. Young Company, Attleboro, Mass.; to deal in general jewelry. Capital, $10,000. Incorporators: President, Harry J. Moelter; vice-president, Henry A. White, both of Attleboro, and treasurer and clerk, Leslie G. Young, of Plainsville.

Elbe Manufacturing Company, Niagara Falls, N. Y.; to manufacture 14 karat jewelry. Max H. Elbe is president and treasurer, and the Hon. John A. Leggett is secretary. The sample line is complete and the product will soon be on the market.

Sanitary Stamped Wares and Specialties Company, New York, N. Y. Capital, $50,000; to manufacture mop wringers and mops, metal goods and hardware. Incorporators: Albert J. Carr, Marjorie W. Carr and David Whitehurst, all of New York.

Monel Metal Manufacturing Company, New York; capital, $1,000,000, to manufacture articles of Monel Metal. Directors: Edmund C. Converse, Greenwich, Conn.; Joseph R. Delmar, of New York, and Elias M. Johnson, of Spuyten Duyvil, New York.

The Draught Bottle Company of America, Jersey City, N. J.; capital, $100,000. To manufacture draught bottles and syphons for dispensing all kinds of carbonated beverages. Officers are: Adam E. Schotz, Mount Vernon, N. Y., president; C. William Wenner, Jersey City, secretary and treasurer, and George P. Kato, Jr., Jersey City, vice president and general manager.

PRINTED MATTER

Artic Metal is the subject of a photograph blotter distributed by J. N. Tallman & Sons, Hamilton, Canada, manufacturers of brass castings, babbitt and solder metals.

The Oliver Typewriter Company, of 310 Broadway, New York, are mailing a card printed in two colors descriptive of their new machine, "Oliver No. 5." They invite inquiry for detailed description.

Metal Hose. The American Metal Hose Company, New York, have issued a pamphlet descriptive of the flexible tubing and metal-covered hose manufactured by the Metallschlauch-Fabrik Pforzheim, Pforzheim (Baden).

Practical Books for Practical Men is the style of a 40-page catalogue issued by the Norman W. Henley Company, 132 Nassau street, New York, describing the latest books relating to the scientific profession and a short synopsis is given of the contents of each work.

Metallized Flowers. The Benedict Art Studio, East Syracuse, N. Y., have issued a 2-page announcement of their readi-

ness to supply at quick notice Benedict's real rose hatpins, which are made of fresh live roses, scientifically metalized and mounted on 10-inch German silver pins.

BRASS FINISHING MACHINES. Harvey Hubbell, Inc., of Bridgeport, Conn., have issued a handsome little 30-page catalogue describing their various forms of single and double tapping, bench riveting and screw slotting machines; it also includes a price list of iron and brass machine screws.

WHITE METAL CASTINGS. The Wetherill Finished Castings Company, Philadelphia, Pa., are sending out a handsome little booklet displaying their Wetherill-Cast Aluminum and Parsons White Brass, which they are very successful in producing in die castings of intricate and difficult shapes.

ROLLING MILLS. The W. W. Oliver Manufacturing Company, Buffalo, N. Y., have recently issued a catalogue, D-16, describing their numerous styles of double geared hand and power rolling mills, together with motor heads for direct power drop presses and various other special machines used in the jewelry trade.

COPPER PRODUCTION

(Issued by the Copper Producers' Association.)

	March 10, 1909. *Pounds.*
Stock of marketable copper of all kinds on hand at all points in the United States, February 1, 1909..	144,130,045
Production of marketable copper in the United States from all domestic and foreign sources during February, 1909.....	103,700,817
Deliveries of marketable copper for consumption and export during February, 1909.....	74,546,614
Stock of marketable copper of all kinds on hand at all points in the United States, March 1, 1909.....	173,284,248

METAL MARKET

NEW YORK, March 11, 1909.

COPPER.—The price of Standard Copper in London shows a net decline for the month of £7 10s. Opening at £63 10s. prices dropped to £55 17s. 6d. and closed at £56.

The New York market has been dull and weak the entire month, and prices have steadily declined. The larger selling agents made an effort to hold prices, but there was more than enough copper pressed in the market to meet the small consuming demand and prices show a net decline for the month of close to 1 cent per pound. The figures as published by the Copper Producers' Association on the 10th of February are not considered entirely satisfactory for the reason that they do not include "pig" or "blister" copper in stock at the smelters, the stocks as published are based only on the so-called "marketable" or refined copper, and even on this basis the figures show an increase for the month of January of 20,000,000 pounds, and the figures for the month of February will probably show a still heavier increase of production over exports and consumption.

The total exports for the month of February were only 13,886 tons. The total exports for the first two months of 1909 show a decrease of 24,583 tons over the same period last year.

The market closed at the lowest prices of the month. Lake 12⅝ to 12⅞, Electrolytic 12¼ to 12.50 and casting brands at 12¼ to 12⅜. Casting copper at the close was scarce and inclined to be higher.

TIN.—The London tin market shows a net advance over the month of close to £6 per ton. London speculators were able to hold the market and push prices up in view of the coming canning season and increased consumption for the spring months.

The New York market has been rather more active, and consumers have been heavier buyers than for some time past. Prices at the close are about 1 cent higher than a month ago.

Consumption for the month was fairly heavy, amounting to 2,700 tons, making the total consumption for the two months of this year about 2,000 tons heavier than the same period last year. The shipments for the same two months are 780 tons less than last year.

Prices for the month show an increase of about 1¼ cents per pound. Closing at 28.60 for 5-10 ton lots spot, with futures at about the same price.

LEAD.—The foreign lead market has advanced about 10s. per ton during the month, and the indications are that prices may go higher in view of a reduction in the American tariff.

In New York the lead market has been dull and weak and prices have declined about ¼ cent per pound. The Trust price has been reduced, but demand has hardly been active enough to take care of the lead in independent hands. The market for carload lots is around 3.80 to 3.85 East St. Louis and 3.95 to 4 cents New York.

SPELTER.—The foreign market advanced about 10s. per ton during February. Higher prices are looked for owing to the combine of the foreign spelter makers to restrict production and hold prices.

In New York prices are about 10 points lower than a month ago, but at the close there is a slightly better feeling, although demand from consumers is very slack. Carload lots New York 5.05 to 5.10.

ANTIMONY.—The London prices for antimony are about £2 per ton lower.

In New York prices have sagged off slightly, and to-day are about 5 to 10 points lower than a month ago. Cooksons 8 cents, Halletts 7¾ cents.

ALUMINUM.—The market for aluminum is more or less nominal with the one maker here "quoting" 24 cents, while the imported metal can be sold at below this figure. The base price of wire and rods unchanged at 33 cents and sheets at 34 cents.

SILVER.—The price of silver in London declined about 11-16d. for the month.

In New York prices are nearly 2 cents per ounce lower and close at the lowest, 50⅝ cents in New York, 23 5-16d. in London.

QUICKSILVER.—There has been no change in the price of quicksilver. Wholesale lots $44.50 per flask and jobbing lots at $45 to $46.50 per flask.

PLATINUM.—The market holds fairly strong at $22.50 to $23.50 for ordinary and $24.50 to $25.50 for hard.

SHEET METAL.—The price of sheet copper has been reduced about 1 cent per pound. The nominal quotations stand at 18 cents, but this can be shaded for attractive orders. Brass sheets and tubes have been reduced one cent per pound. Copper wire has been reduced to 14½ cents.

The old metal market has been dull and disappointing with the steady and persistent drop in copper, and consumers holding off and turning down all material possible. Prices are more or less nominal and business very dull.

THE FEBRUARY MOVEMENTS IN METALS

	Highest.	Lowest.	Average.
COPPER.			
Lake	14.00	12.87½	13.50
Electrolytic	13.50	12.50	13.15
Casting	13.25	12.25	12.90
TIN	29.00	27.40	28.35
LEAD	4.20	3.95	4.05
SPELTER	5.10	4.60	4.85
ANTIMONY (Halletts)	8.15	7.95	8.05
SILVER	.52⅜	.50⅝	51.47

INFORMATION BUREAU

Any firm intending to buy metals, machinery or supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Commercial questions are answered by return mail. Our Information Bureau is for the purpose of answering questions of all kinds. Address THE METAL INDUSTRY, 61 Beekman street, New York.

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the report alone is $10. Sample copies furnished for the asking. We can also furnish daily telegraphic reports of metal prices. Address THE METAL INDUSTRY, 61 Beekman street, New York.

Metal Prices, March 12, 1909.

NEW METALS.

	Price per lb. Cents.
COPPER—PIG, BAR AND INGOT AND OLD COPPER. Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	13.00
Electrolytic, car load lots	12.75
Casting, car load lots	12.50
TIN—Duty Free.	
Straits of Malacca, car load lots	28.60
LEAD—Duty Pigs, Bars and Old, 2⅛c. per lb.; pipe and sheets, 2½c. per lb.	
Pig lead, car load lots	4.00
SPELTER—Duty 1½c. per lb.	
Western, car load lots	5.05
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods, 13c. per lb.	
Small lots	28.00
100 lb. lots	25.00
Ton lots	24.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's cask lots, nominal	8.00
Hallett's, cask lots	7.75
Other cask lots	7.60
NICKEL—Duty, 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
MANGANESE METAL—Duty 20%	.80
MAGNESIUM METAL—Duty free	1.30
BISMUTH—Duty free	1.80
CADMIUM—Duty free	1.00
	Price per oz.
GOLD—Duty free	$20.67
SILVER—Duty free	.50⅝
PLATINUM—Duty free	23.75
QUICKSILVER—Duty 7c. per lb. Price per pound	62c. to 63c.

OLD METALS.

	Price per lb. Cents.	
Heavy Cut Copper	10.75	11.50
Copper Wire	10.50	10.75
Light Copper	9.25	9.50
Heavy Mach. Comp.	9.50	10.00
Heavy Brass	7.50	8.00
Light Brass	5.00	6.00
No. 1 Yellow Brass Turnings	6.50	7.00
No. 1 Comp. Turnings	8.00	8.50
Heavy Lead	3.69	3.70
Zinc Scrap	3.00	3.50
Scrap Aluminum, turnings	6.00	7.00
Scrap Aluminum, cast, alloyed	13.00	16.00
Scrap Aluminum, sheet (new)	16.00	18.00
Old Nickel, solid	19.00	23.00
No. 1 Pewter	18.00	19.00

INGOT METALS.

	Price per lb. Cents.
Silicon Copper 10% to 20%	according to quantity 28 to 30
Silicon Copper, 30%, guaranteed	" " 30 to 32½
Phosphor Copper, 5%	" " 19 to 21
Phosphor Copper, 10% to 15%, guaranteed	" " 28 to 30
Manganese Copper, 30%	" " 30 to 35
Phosphor Tin	" " 34 to 36
Brass Ingot, Yellow	" " 9 to 10
Brass Ingot, Red	" " 12 to 13
Bronze Ingot	" " 11 to 12
Manganese Bronze	" " 17 to 19
Phosphor Bronze	" " 13 to 16
Casting Aluminum Alloys	" " 29 to 35

PHOSPHORUS—Duty 18c. per lb.
According to quantity ..... 32 to 40

PRICES OF SHEET COPPER.

BASE PRICE, 18 Cents per Lb. Net.

PRICES MENTIONED BELOW ARE FOR QUANTITIES OF 100 LBS. AND OVER.

SIZE OF SHEETS.		64 oz. and over 50 lb. sheet 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lbs. sheet 30 x 60.	24 oz. to 32 oz. 18¾ to 25 lb. sheet 30 x 60.	16 oz. to 24 oz. 12½ to 18¾ lb. sheet 30 x 60.	14 oz. and 15 oz. 11 to 12½ lb. sheet 30 x 60.	12 oz. and 13 oz. 9½ to 11 lb. sheet 30 x 60.	10 oz. and 11 oz. 7¾ to 9½ lb. sheet 30 x 60.	8 oz. and 9 oz. 6¼ to 7¾ lb. sheet 30 x 60.	Lighter than 8 oz.
		Cents Per Pound Over Base Price for Soft Copper.								
Not wider than 30 ins.	Not longer than 72 inches.	Base	Base	Base	Base	1	2	3	6	9
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	1	3	6	9	
	Longer than 96 inches.	"	"	"	"	2	6			
Wider than 30 ins. but not wider than 36 inches.	Not longer than 72 inches.	"	"	"	"	2	4	7	10	
	Longer than 72 inches. Not longer than 96 inches.	"	"	"	"	2	6	9		
	Longer than 96 inches. Not longer than 120 inches.	"	"	"	1	3				
	Longer than 120 inches.	"	"	1	2					
Wider than 36 ins. but not wider than 48 inches.	Not longer than 72 inches.	"	"	1	2	4	7	10		
	Longer than 72 inches. Not longer than 96 inches.	"	"	1	3	5	8			
	Longer than 96 inches. Not longer than 120 inches.	"	"	2	4	8				
	Longer than 120 inches.	"	1	3	6					
Wider than 48 ins. but not wider than 60 inches.	Not longer than 72 inches.	"	Base	1	3	6	11			
	Longer than 72 inches. Not longer than 96 inches.	"	"	2	4	9				
	Longer than 96 inches. Not longer than 120 inches.	"	1	3	6					
	Longer than 120 inches.	1	2	4	8					
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 inches.	Base	1	3	8					
	Longer than 96 inches. Not longer than 120 inches.	"	2	5	10					
	Longer than 120 inches.	1	3	8						
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 inches.	1	3	6						
	Longer than 96 inches. Not longer than 120 inches.	2	4	7						
	Longer than 120 inches.	3	5	9						
Wider than 108 ins.	Not longer than 132 inches.	4	6							
	Longer than 132 inches.	5	8							

The longest dimension in any sheet shall be considered as its length.

CIRCLES, SEGMENTS AND PATTERN SHEETS, advance over prices of Sheet Copper required to cut them from. 3 cents per pound.

COLD OR HARD ROLLED COPPER, 14 oz. per square foot, and heavier, add ..... 1 " " "

COLD OR HARD ROLLED COPPER, lighter than 14 oz., per square foot, add ..... 2 " " "

POLISHED COPPER, 20 INCHES WIDE and under, advance over price for Cold Rolled Copper of corresponding dimensions and thickness ..... 1 " " "

POLISHED COPPER, WIDER THAN 20 INCHES, advance over price for Cold Rolled Copper of corresponding dimensions and thickness ..... 2 " " "

COLD ROLLED COPPER, PREPARED SUITABLE FOR POLISHING, same as Polished Copper of corresponding dimensions and thickness.

COLD ROLLED AND ANNEALED COPPER SHEETS OR CIRCLES, same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

ROUND COPPER ROD, ⅜ inch diameter or over ..... Base Price.
(Rectangular, Square and Irregular Shapes, Copper Rod, Special Prices.)

ZINC—Duty, sheet, 2c. per lb.	Cents per lb.
Mill price, carload lots	6.75 less 8%
Casks	7.25
Open casks	7.75

Metal Prices, March 12, 1909

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect Feb. 25, 1909, and until further notice.

To customers who purchase less than 40,000 lbs. per year and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.13½	$0.15½	.17
Wire	.13¾	.15¾	.17¼
Rod	.13¾	.15¾	.18¼
Brazed tubing	.19⅞	—	.22
Open seam tubing	.17⅞	—	.20
Angles and channels, plain	.17⅞	—	.20

30% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass..	⅛c. per lb. net advance
" —Best spring, drawing and spinning brass....	1⅛c. " " " "
Wire—Extra spring and brazing wire.....	⅛c. " " " "
" —Best spring and brazing wire.....	1c. " " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14½	$0.16½	$0.18
Wire	.14¾	.16¾	.18¼
Rod	.14¾	.16¾	.19¼
Brazed tubing	.20⅞	—	.23
Open seam tubing	.18⅞	—	.21
Angles and channels, plain	.18⅞	—	.21

5% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass...	⅛c. per lb. net advance.
" —Best spring, drawing and spinning brass....	1⅛c. " " " "
Wire—Extra spring and brazing wire	⅛c. " " " "
" —Best spring and brazing wire.....	1c. " " " "

BARE COPPER WIRE—CARLOAD LOTS.

14¼c. per lb. base.

SOLDERING COPPERS.

500 lbs. and over in one order.....	18½c. per lb. base.
100 lbs. to 500 lbs. in one order.....	19c. " " "
Less than 100 lbs. in one order.....	20½c. " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in O. D. Nos. 4 to 13 Stubs' Gauge, 19c. per lb.
Seamless Copper Tubing, 23c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	27	26	21	20	19	19	19	19	19	19	19	20	21	23	25	26

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet— Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1¼ inch	22	24
1½ inch	25	27
1½ inch	32	35
1¾ inch	45	48
2 inch	56	60

Discount 45 and 5%.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Muntz or Yellow Metal Sheathing (14" x 48")....	14c. lb. net base
" " " Rectangular sheets other than Sheathing	16c. " " "
" " " Rod	15c. " " "
Tobin Bronze Rod	17c. " " "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bars in the rough 22¼c. net.
German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.
Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quantity.
Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

	Wider than..... and including..... in coils.	8in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.
No. 13 and heavier		34	34	36	36	36	36	39	39	39
" 14		34	34	36	36	36	36	39	39	39
" 15		34	34	36	36	36	36	39	39	39
" 16		34	34	36	36	36	36	39	39	39
" 17		34	34	36	36	36	36	39	39	39
" 18		34	34	36	36	36	36	39	39	42
" 19		34	34	36	36	36	36	39	40	43
" 20		34	36	36	36	36	38	41	42	44
" 21		34	38	38	38	38	40	43	44	50
" 22		34	38	38	38	40	40	43	47	51
" 23		34	38	38	38	40	40	43	49	52
" 24		34	38	40	42	42	42	45	51	54
" 25		36	39	41	43	43	43	46	53	57
" 26		36	39	42	46	46	46	51	55	61
" 27		36	40	44	48	48	49	54	58	64
" 28		36	40	46	48	49	49	56	62	67
" 29		38	41	48	50	52	52	61	67	72
" 30		38	42	50	52	56	62	69	72	77
" 31		43	47	55	58	63	71	74	77	83
" 32		45	49	57	61	69	77	91	90	95
" 33		47	51	60	65	73	84	91	100	110
" 34		50	55	62	70	78	91	103	110	120
" 35		..	65	70	80	90	100	115	125	..
" 36		..	80	90	100	115	120	135	..	..
" 37		..	104	114	129	144	159	174	..	..
" 38		..	124	139	154	169	184	204	..	..
" 39		..	144	164	184	204	224	..	..	..
" 40		..	174	204	224	244	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are 100 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST SEAMLESS ALUMINUM TUBING.

STUBS' GUAGE THE STANDARD. SIZES CARRIED IN STOCK.

Outside Diameters. BASE PRICE, 25 Cents per Pound.

Stubs' Guage.	Inches.	¼ in.	5-16 in.	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.	1¼ in.	1½ in.	1¾ in.	2 ins.	2½ ins.	3 ins.	3½ ins.	4 ins.	4½ ins.
11.	.120.	..	..	..	..	..	..	..	26	23	..	..	13	11	9	8	15	23
12.	.109.	..	..	..	..	..	..	..	25	..	..	..	14	..	..	..	..	..
14.	.083.	..	..	..	..	..	..	..	..	..	..	..	16	..	..	..	..	..
16.	.065.	..	..	..	..	..	27	26	26	23	22	20	20	20	20	26	30	56
18.	.049.	..	..	..	..	32	29	28	27	24	25	25	25	..	..	..	..	..
20.	.035.116	..	45	38	33	32	31	29	28	28	29	29	29	30	37	48	57	80
21.	.032.	..	..	..	39	..	..	..	..	..	..	..	..	..	..	..	..	..
22.	.028.137	97	47	41	37	36	34	33	..	..	44	..	..	..	..	..	..	..
24.	.022.187	132	107	87	78	72	61	59	65	..	..	..	..	..	..	..	..	..

Prices are for ten or more pounds at one time. For prices on sizes not carried in stock send for Manufacturers' List.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter. B. & S. G'ge.	000 to No. No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb. ...	32	32½	32½	33	33½	34	34¼	35	36	37	38	43	46

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50%.

GERMAN SILVER TUBING.

4	per cent.	to No.	19, B. & S.	Gauge, inclusive	$0.66
6	"	"	19, "	" "	.76
9	"	"	19, "	" "	.85
12	"	"	19, "	" "	1.00
15	"	"	19, "	" "	1.15
16	"	"	19, "	" "	1.20
18	"	"	19, "	" "	1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.
For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 40%.

PRICE OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quality and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.
Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion

See Next Page for Want Advertisements.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

CASTINGS, METALS AND BRASS GOODS WANTED

WE SOLICIT BIDS

ON MATERIAL REQUIRED FOR OUR 1910 PRODUCTION SCHEDULE OF

12,000 AUTOMOBILES

Among the items for which we shall shortly be open to place contracts are:

200 Tons Aluminum Castings,
150 Tons Brass Castings,
50 Tons Babbitt,
125,000 ft. Brass Tubing.
60,000 Brass Cocks,
20,000 Brass Heel Board Hinges,
10,000 Flush Catches,
20,000 Brass Door Handles,
50,000 Stamped Brass Hub Caps,
15,000 Brass Pulls,
5,000 Brass Oil Guns,
12,000 Copperized Oilers.

Address all communications relative to the above to the "Purchasing Dept.," at our Main Office, Tarrytown, N. Y.

MAXWELL-BRISCOE MOTOR CO.,

Tarrytown, N. Y. Pawtucket, R. I. New Castle, Ind.

METALS, MACHINERY AND SUPPLIES FOR SALE

FOR SALE
ONE NO. 2
Double Chamber Rockwell Furnace
ALMOST NEW
Address ROCKWELL, care THE METAL INDUSTRY

FOR SALE

Foreign rights of a VALUABLE PLATING APPARATUS. A device which means the saving of thousands of dollars in a year's time to any plating establishment. Scrap nickel all consumed. Terms moderate. Address,

FOREIGN PATENT, care THE METAL INDUSTRY, N. Y.

COPPER AND BRASS SCRAP LEAD AND COPPER
WASTE AND BELTING IRON AND MACHINERY
Bought and Sold. Write Particulars
WALSH'S SONS & CO., Newark, N. J.

FOR SALE—1200 pounds .822 x No. 24 B. & S. Plain Brazed Brass Tubing in 16½ ft. lengths. Newly manufactured stock in A1 condition. Address THE SUSQUEHANNA METAL MANUFACTURING COMPANY, SUSQUEHANNA, PA.

FOR SALE.—A PHOENIX PLATING DYNAMO, about 6 volts, 1,500 amperes in first class condition. Address, THE WEHLE COMPANY, NEWARK, OHIO.

WANTED.—To correspond with buyers of METALLIC BISMUTH and BISMUTH ORES in quantity. Address Box M-10, care THE METAL INDUSTRY.

FOR SALE—One HILL CRUSHER for use in Brass Foundry for Brass Ashes. Very little used, good as new. Will be sold cheap. Address X. Y. Z., care THE METAL INDUSTRY.

FOR SALE.—Novelty manufacturer can buy a good paying REAL ROSE HAT PIN business very cheap. Formula and equipment complete. Present owner can also be engaged by purchaser. Address HAT PINS, care THE METAL INDUSTRY.

FOR SALE.—WOULD A HUSTLING BRASS MANUFACTURING CORPORATION, with finely equipped shop, near New York, standing orders from large buyers, increasing sales, interest you? Best reasons for selling control. About $30,000 required. Buyer handles business and financial end. Goods patented. Widely catalogued. Demand practically unlimited, efficient sales organization. Principals, come see for yourselves. P. O. BOX 458, Newark, N. J.

PLATING DYNAMOS, also alternating and direct current motors and dynamos at bargain prices, all makes and sizes bought, sold and repaired. Department F. EUGENE L. RICHTER ELECTRIC CO., N. E. Cor. Uber and Columbia avenue, Philadelphia, Pa.

FOR SALE—POLISHING and PLATING JOB SHOP in a Michigan city of 28,000 population; no competition. Bargain if taken at once. Reason for selling, other business. Equipment consists of one 5 horse power boiler for heating, one 5 horse power motor, two polishing lathes, good supply of polishing wheels, two plating dynamos (one 150 ampere and one 75 ampere), one 200 gallon nickel tank, one 250 gallon cyanide copper tank, one 75 gallon acid copper tank, one 140 gallon brass tank and one 60 gallon brass tank, also a good supply of anodes for all of these tanks. For further particulars, address BOX 110, care THE METAL INDUSTRY.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

METALS, MACHINERY AND SUPPLIES WANTED

WANTED—A manufacturer of metal goods would like to correspond with manufacturers of PRESSED BRASS STRIPS for ornamental designs. Address PRESSED BRASS, care THE METAL INDUSTRY.

WANTED—An experienced man who is capable of fitting up and installing a METAL REFINERY in a works which intends to put up a plant. Address REFINERY, care THE METAL INDUSTRY.

We PAY CASH for GOLD, SILVER and PLATINUM SCRAPS, SOLUTIONS and SWEEPINGS; Old Nickel Anodes, New or Old Mercury, Bismuth, Gas Mantle Dust and Chemicals, etc. EMPIRE CHEMICAL WORKS, 416 East 52d street, New York City.

CASH PAID for bronze Powder Waste, Gas Mantle Dust, Bismuth, Nickel Mercury, Platinum, Osmoiridium and similar metals in any form. JOSEF RADNAI, 36 Fulton street, New York.

WANTED.—A second-hand PLATING MACHINE, 150 to 200 amperes. Send full particulars. Address PLATING MACHINE, care THE METAL INDUSTRY.

OPPORTUNITIES

PLATERS

By enclosing ten cents in stamps we will forward you one of our anode protectors which will save you work and employer money and keep your solution in better condition than formerly. Address,

PLATERS NOVELTY COMPANY

Box 26, Woodhaven, L. I., N. Y.

British New Patents Act

Advertiser is desirous of undertaking the manufacture of American patents in England. Stamped work of all description. Aluminum work a specialty.

WILFRED & CO., Ltd.

BIRMINGHAM, ENGLAND

BRASS FOUNDERS

Practical information bureau, 40 years' experience with trade secrets, from the furnace to the finisher. Work in all known metals, from common brass to the secret process of tempering copper. 40 formulas, worth a thousand dollars.

PREPAID TO ANY ADDRESS ON RECEIPT OF FIVE DOLLARS.

JAMES ALLEN

2552 J Street, : : : SAN DIEGO, CAL.

WANTED

Energetic workers wanted at once as subscriptions agents.

$50.00 A MONTH

in commissions guaranteed for four subscription orders a day. For further particulars write

THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

J. P. FANNING, machinist, 678-Jefferson avenue, Brooklyn, N. Y.—Maker of Moulds for Casting Solder, Babbitt Metal, Bar Lead, etc. We also manufacture small work. Write for particulars.

WANTED—Copies of THE METAL INDUSTRY for the months of MAY, 1906, NOVEMBER and DECEMBER, 1908. Anyone having the above mentioned copies, kindly advise THE METAL INDUSTRY.

GOOD SALES, GOOD EQUIPMENT, GOOD ASSISTANTS and GOOD POSITIONS may be obtained by the insertion of a METAL INDUSTRY WANT.

INQUIRIES.

Inquiry No. 70—Would like to correspond with producers of "Mercury Quicksilver."

Inquiry No. 71—We are in the market for tinned steel in long strips tinned on both sides.

Inquiry No. 72—Would like to correspond with manufacturers of modern brass foundry equipment.

A manufacturer wishes to correspond with sellers of high grade copper scrap. Address SCRAP, care THE METAL INDUSTRY.

Inquiry No. 73—Would like to hear from firms who manufacture first class kerosene burners for use in heating and japanning ovens.

Inquiry No. 74—Would like to hear from firms who manufacture powdered tin, also lead.

Inquiry No. 75—Would like to hear from makers of polished brass.

Inquiry No. 76—We are in the market for plain and rope tin tubes ⅛ to 1 in. and in lengths from 6 ins. to 72 ins.

Inquiry No. 77—We are contemplating installing a bower-barff plant and would like to hear from the manufacturers of this equipment.

Inquiry No. 78—Would like to hear from foundries making castings of an alloy having about the strength of brass and that can be molded with threads.

Inquiry 79—We would like to hear from reliable manufacturers who make a specialty of installing plants for smelting and refining.

Inquiry 80—Would like to hear from manufacturers of electrolytic zinc, also of ferro zinc, containing 5 per cent. of iron.

SITUATIONS OPEN—Commercial

TRAVELLING SALESMAN WANTED

I would like to employ a man to begin at once, who has had experience in the sale of Foundry Facings and Supplies, and also has some knowledge of a plating establishment so he might offer in conjunction Buffing Compositions and Platers' Supplies. Address, stating age, salary required, etc. **SALESMAN,** care of **THE METAL INDUSTRY.**

WANTED—By a manufacturer of a limited line of high grade SANITARY BRASS GOODS, active SELLING AGENTS who are at present soliciting business from the plumbing trade to handle this line on a commission basis. In replying state territory in which you are operating and the lines which you are offering. Address MANUFACTURER, care THE METAL INDUSTRY.

SITUATIONS OPEN—Founders

WANTED—A PRACTICAL BRASS FOUNDRYMAN on small bench work to equip and manage a brass foundry on modern lines. At first would start moderately, about one ton weekly. This is a modern foundry built within the last three years for a first-class brass foundry, but equipment is to be installed. It is not a jobbing foundry, but part of a large manufacturing plant. Located within 25 miles of Boston. A strictly first class man with reference, experience and salary expected. Address BOX M-4, care THE METAL INDUSTRY.

WANTED—A SUPERINTENDENT for BRASS FOUNDRY and MACHINE SHOP. One who is capable of making a success in a brass foundry and machine shop manufacturing light and heavy castings and car trimmings. Must understand detail work and be a good estimator of blue prints. Good salary and interest in concern for right party. Write giving full particulars, BOX M-3, care THE METAL INDUSTRY.

WANTED—A working FOREMAN for BRASS FINISHING department who thoroughly understands plumbers' supplies. Address BRASS FINISHING, care THE METAL INDUSTRY.

WANTED—A BRASS FOUNDRYMAN who has had experience in making castings for PLUMBERS' SUPPLIES. Good opportunity for the right party. Address CASTINGS, care THE METAL INDUSTRY.

WANTED—A practical man who understands thoroughly the manufacture of BRAZING SOLDER. Good opportunity for the right man. Address SOLDER, care THE METAL INDUSTRY.

WANTED.—SOFT METAL CASTERS, accustomed to handling slush molds. Address THE ART METAL WORKS, 7-15 MULBERRY ST., NEWARK, N. J.

WANTED.—FOUNDRY FOREMAN wanted to sell our equipment on a liberal commission basis. Address BOX 159, care THE METAL INDUSTRY.

SITUATIONS OPEN—Platers

WANTED—A working FOREMAN PLATER who has had experience in plumbers' supplies. Address PLATER, care THE METAL INDUSTRY.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

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SITUATIONS OPEN—Platers—Continued

WANTED—A thoroughly experienced, well recommended man to supervise a large POLISHING and PLATING department in fancy METAL GOODS FACTORY. Must be familiar with all modern methods of polishing, understanding all branches of GOLD, SILVER and NICKEL PLATING. Address, BOX M-2, care THE METAL INDUSTRY.

WANTED.—PLATER experienced in acid copper solutions. Must be a man who can handle help and understands acid copper plating. Address BOX 194, care THE METAL INDUSTRY.

WANTED.—First Class SILVER BUFFER for small plated work. Prefer man who can BURNISH. To such a man a steady position is open. Address BOX 206, care THE METAL INDUSTRY.

SITUATIONS WANTED—Commercial

Advertisements under this head will be insterted for 20 cents per line, 3 lines for Half a Dollar.

SITUATION WANTED—SALESMAN is open to a proposition from a BRASS MILL or a manufacturer of METAL GOODS. Any territory. First class references. Address M-5, care THE METAL INDUSTRY.

SITUATION WANTED.—Experienced BRASS factory man is open for engagement. Thorough executive from FOUNDRY to SHIPPING ROOM. Expert Cost Accountant and Purchasing Agent, Advocate of piece work and bonus systems. Can decrease labor cost and increase output. If you can use a man of my qualifications, address EXPERT, care THE METAL INDUSTRY.

SITUATION WANTED.—SALESMAN experienced in both steam and plumbing lines is open for a position. Thorough acquaintance with the trade in all sections except Pacific Coast. Knows the business thoroughly and can sell goods. Address HUSTLER, care THE METAL INDUSTRY.

SITUATION WANTED.—First class ACCOUNTANT and BUSINESS MANAGER with good experience and reference desires position with reputable manufacturing concern. Address BOX 207, THE METAL INDUSTRY.

SITUATION WANTED.—Superintendent or Manager with a large experience in the manufacture of BRASS GOODS from sheet, rod, tubing and castings. Familiar with all details of factory and office. Also a good salesman. Address BOX 149, care THE METAL INDUSTRY.

SITUATIONS WANTED—Founders

SITUATION WANTED—By a METALLURGIST. Can advise by mail. Familiar with NON-FERROUS ALLOYS. Foundry Managers invited to investigate my up-to-date methods. Address T, care THE METAL INDUSTRY.

SITUATION WANTED—By a CHEMIST. Brass Foundries can receive benefit of my experience at low cost. Familiar with all details. Write for further particulars. Address H, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class BRASS MOLDER who has had a large experience in foundries in the vicinity of New York. Would prefer position near New York. Address BOX 196, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class FALSE CORE MOULDER on architectural bronze and chandelier work. Sixteen years' experience and is capable of running a foundry. Address BOX 180, care THE METAL INDUSTRY.

SITUATION WANTED—By a competent BRASS FOUNDRY FOREMAN. Accustomed to both large and small work. Good references. Has had experience with large firms. Address FOREMAN, care THE METAL INDUSTRY.

SITUATION WANTED.—By a BRASS MOLDER who has had experience in both light and heavy brass work. Is competent of doing any class of brass work. Address BOX 202, care THE METAL INDUSTRY.

SITUATION WANTED.—BRASS FOUNDER with 16 years' experience in all kinds of foundry work. Thoroughly familiar with molding machines, oil furnaces and different mixtures. Have been foreman in several shops and can furnish good reference. Address BOX 203, care THE METAL INDUSTRY.

SITUATION WANTED.—By a BRASS FOUNDRY FOREMAN who has had a large experience in brass foundry work and can furnish good reference from last employers. Address BOX 204, care THE METAL INDUSTRY.

SITUATION WANTED.—BRASS FOUNDRY FOREMAN or SUPERINTENDENT having had full charge of foundry for 26 years manufacturing car, locomotive, automobile and machinery castings. Can furnish the best of references. Address BOX 183, care THE METAL INDUSTRY.

SITUATIONS WANTED—Founders—Continued

SITUATION WANTED.—By a CORE MAKER who has had 12 years' experience on all classes of cores, the last three years on CHANDELIER work. Capable of taking charge and can furnish good reference. Address BOX 197, care THE METAL INDUSTRY.

SITUATION WANTED.—By a first class CORE MOLDER who has had a large experience in this line. Can furnish reference. Address BOX 198, care THE METAL INDUSTRY.

SITUATION WANTED.—By a BRASS MOLDER who has had 20 years' experience in this line. Can furnish reference. Address BOX 201, care THE METAL INDUSTRY.

SITUATION WANTED.—By a first class FALSE CORE MOLDER in French sand. Understands all branches in green sand, also in dry work. Position as FOREMAN desired. Can take charge of men. Address BOX 134, care THE METAL INDUSTRY.

SITUATION WANTED.—FOREMAN MOLDER would like a position. Thoroughly familiar with all classes of work in this line. Address BOX 164, care THE METAL INDUSTRY.

SITUATION WANTED.—Position as FOUNDRY FOREMAN or SUPERINTENDENT in brass. Have had twenty years' experience and can give the best of references. Do my own mixing. Address O-21, care THE METAL INDUSTRY.

SITUATIONS WANTED—Finishers

SITUATION WANTED.—By a first class BRASS WORKER who has had 10 years' experience on bench, speed lathe, brazing and different kinds of jobbing work. Good reference from last employer. Address BOX 200, care THE METAL INDUSTRY.

SITUATION WANTED.—BRASS TURNER who has had a large experience as foreman would like to hear from any firms who are in need of such a man. Can furnish good reference. Address BOX 205, care THE METAL INDUSTRY.

SITUATIONS WANTED—Platers

SITUATION WANTED—By a FOREMAN PLATER who has had a large experience in Electro Nickel, Brass, Copper Plating, Oxidizing, Brass Dipping and Lacquering. Address, C. S., care THE METAL INDUSTRY.

SITUATION WANTED—By a young man who has had 8 years' experience. Can do all kinds of PLATING and FANCY COLORING. Position in New York City or vicinity preferred. Address BOX 175, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class PLATER who prefers to work in the States of New York or New Jersey. Good, sober, steady, reliable man and is thoroughly capable of doing polishing and buffing. Address CAPABLE, care THE METAL INDUSTRY.

SITUATION WANTED—By a PLATER who has had over 15 years' experience as Foreman. Thoroughly capable of taking charge and can furnish good reference. Address M-7, care THE METAL INDUSTRY.

SITUATION WANTED—By a first class PLATER who has had 18 years' experience on all finishes on any metal. Can furnish good reference. Address M-6, care THE METAL INDUSTRY.

SITUATION WANTED.—By an ELECTRO-PLATER, 18 years' experience with Nickel, Copper, Brass and Bronze solutions and oxidizing. Can furnish good reference. Address BOX M-9, care THE METAL INDUSTRY.

SITUATION WANTED.—By an all round DEPOSIT EXPERT. Practical man in all its branches. A first class Designer, Engraver, and Etcher, having a fine white paint, one paint for silver and china. Also plate wood, horn and natural flowers and ornamental electrotyping on rubber. Address DEPOSIT EXPERT, care THE METAL INDUSTRY.

SITUATION WANTED—By a FOREMAN PLATER with fifteen years' experience as plater and polisher. Can handle with excellent results Gold, Silver, Copper, Nickel, Brass and Bronze Solutions and their different finishes. Can furnish good reference. Address, BOX 158, care THE METAL INDUSTRY.

SITUATION WANTED—First class PLATER and FINISHER who can make all solutions, also do fancy coloring and polishing on silverware and jewelry. Has had nine years' experience on new and old work. Would like steady position. Address BOX 136, care THE METAL INDUSTRY.

SITUATION WANTED.—By a Silver, Nickel, Copper, Brass or Gold Plater who is willing to start at a moderate salary. Can furnish the best of references. Address BOX 185, care THE METAL INDUSTRY.

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SITUATIONS WANTED—Platers—Continued

SITUATION WANTED.—By a PLATER with 15 years' experience, thoroughly understanding all solutions, silver deposit, galvano plastic work, etc. Address BOX 169, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER, POLISHER and BUFFER with 15 years' experience. Hustler and can produce good work. Sober, reliable and can furnish the best of reference from my last employer. Would like to locate west of Chicago. Address BOX 150, care THE METAL INDUSTRY.

SITUATION WANTED.—Chaser experienced on repousse work desires a position. Out of town preferred. Address BOX 182, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PRACTICAL PLATER. Can plate on all metals and produce all finishes. Experienced in deposition and etching. Twenty years' experience and is thoroughly capable of taking charge. Address ORMOLU, care THE METAL INDUSTRY.

SITUATION WANTED.—By a competent PLATER who thoroughly understands the plating business from beginning to end. Is capable of taking charge and can furnish the best of references. Address BOX 184, care THE METAL INDUSTRY.

SITUATION WANTED.—By a first class PLATER who understands every branch of solutions, dips, dynamos, polishing, grinding, cutting down, etc. Has had 20 years' experience with one firm who will give the best of references. Thoroughly familiar with any kind of work; up-to-date and hustler. Address BOX 186, care THE METAL INDUSTRY.

SITUATION WANTED.—By a first-class POLISHER, PLATER and BUFFER; 20 years experience, and now foreman in charge of large shop. Address POLISHER, care THE METAL INDUSTRY.

SITUATION WANTED.—By an experienced PLATER in nickel, copper, brass and silver, also dipping and oxidizing. Thoroughly understands all finishes and can furnish best of references. Address BOX 187, care THE METAL INDUSTRY.

SITUATION WANTED.—A FIRST CLASS PLATER who desires a position as foreman, who has had 22 years' experience in polishing, plating and buffing. Address BOX 188, care THE METAL INDUSTRY.

SITUATION WANTED.—By a FOREMAN PLATER, buffer, polisher, dipper and lacquerer who has had a large experience on chandelier work. A good steady worker who can furnish the best of references. Address BOX 189, care THE METAL INDUSTRY.

SITUATION WANTED.—PLATER who has had 18 years' experience in nickel, copper and brass plating, also oxidizing. A large experience in steel range work and heaters. Have had charge of polishing, plating and buffing departments and can furnish the best of references. Address BOX 190, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER with 12 years' experience on nickel, copper, brass, oxidizing and all the different finishes. Position in Chicago or vicinity preferred. Can furnish best of references. Address BOX 191, care THE METAL INDUSTRY.

SITUATION WANTED.—By a first class PLATER thoroughly familiar with oxidizing and refinishing. Has had 18 years' experience and is capable of taking charge. Can furnish the best of references. Address BOX 192, care THE METAL INDUSTRY.

SITUATION WANTED.—By PLATER, second man on brass, nickel, silver, copper. Understands all finishes. Out of town preferred. Address BOX 132, care THE METAL INDUSTRY.

SITUATION WANTED.—As a FOREMAN or ASSISTANT FOREMAN PLATER. Thoroughly familiar with all kinds of plating, oxidizing, etc. Address BOX 171, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER of 16 years' experience, understanding all solutions, including verde antique. Address BOX 172, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER with 12 years' experience, thoroughly understanding all details of the plating trade. Can furnish excellent reference. Address BOX 173, care THE METAL INDUSTRY.

SITUATION WANTED.—A first class PLATER who is at the present time employed but desires to change, would like to hear from firms desiring a man who thoroughly understands the plating, buffing, etc., of all metals. Address BOX 174, care THE METAL INDUSTRY.

SITUATIONS WANTED—Platers—Continued

SITUATION WANTED.—By a First Class PLATER with several years' experience. Can furnish the best of references. Address O-20, care THE METAL INDUSTRY.

SITUATION WANTED.—FOREMAN of polishing, plating and buffing departments who is thoroughly experienced on brass goods, fine mechanical tools and machinery. Twenty years' experience, 7 years of foremanship. Up-to-date, able to handle help to best advantage, to turn out work at low cost, sober, reliable and can furnish the best of reference from my last two employers. Address BOX 193, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER who has had 14 years' experience in the plating trade. Understands all solutions and can furnish the best of reference. Address BOX 179, care THE METAL INDUSTRY.

SITUATION WANTED.—By a plater who thoroughly understands the plating, polishing, oxidizing and enameling on iron and brass. Long experience as foreman of different departments in plating plants. Address BOX 177, care THE METAL INDUSTRY.

SITUATION WANTED.—By a FOREMAN PLATER with 18 years' experience in plating business, 10 years' experience as foreman of plating and buffing departments. Address BOX 136, care THE METAL INDUSTRY.

SITUATION WANTED.—By a FOREMAN PLATER who can handle help to advantage. Can also do polishing and buffing. Nine years' experience, and can furnish best of reference. Address BOX 165, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER who has had a long experience in the plating business. Thoroughly understands all solutions and finishes. Address BOX 166, care THE METAL INDUSTRY.

SITUATION WANTED.—PLATER up-to-date in ALL FINISHES. Six years' experience and can furnish the best of reference. Address BOX 131, care THE METAL INDUSTRY.

SITUATION WANTED.—By FIRST CLASS PLATER AND POLISHER. Has had 16 years' experience and had charge of men for the last 10 years. Can handle any kind of a plant, understands all finishes and can give good reference. Address O-19, care THE METAL INDUSTRY.

SITUATION WANTED.—FOREMAN PLATER desires a position with NOVELTY OR BUCKLE MANUFACTURER. Thoroughly familiar with all solutions and finishes on BRASS, German Silver, Britannia and Soft Metals. Can take charge of help to advantage. Address BOX 145, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER on Gold, Silver, Black Nickel, Brass, Bronze and Tin. Plating Verde Green, Oxidizing. Address O-22, care THE METAL INDUSTRY.

SITUATION WANTED.—By a PLATER thoroughly familiar with Nickel, Silver, Brass, Copper plating and oxidizing. Can furnish the best of reference. Address BOX 140, care THE METAL INDUSTRY.

SITUATION WANTED.—By a FOREMAN PLATER who thoroughly understands polishing and buffing. Large experience on plumbers' supplies, builders' hardware and job shop work. Thoroughly capable of taking charge of plating room. Address BOX 135, care THE METAL INDUSTRY.

SITUATION WANTED.—By a first class PLATER, POLISHER and BUFFER. Twenty years' experience in all branches of plating work. Expert in all solutions and finishes, silver deposit, galvano plastic, metallizing non-metallic subjects, cold galvanizing, lacquering. Sober, reliable, and can furnish the best of reference. Address BOX 151, care THE METAL INDUSTRY.

SITUATION WANTED.—NICKEL and BRASS PLATER. Forty years old, sober and industrious. Experienced in the making of all solutions. Steady position desired. Moderate wages. Address BOX 133, care THE METAL INDUSTRY.

SITUATION WANTED.—By a plater who has made a specialty of GALVANO PLASTIC WORK. Can furnish the best of reference. Address BOX 143, care THE METAL INDUSTRY.

SITUATION WANTED.—By a first class GOLD, SILVER, NICKEL, BRASS or COPPER and all round PLATER to take charge of large plating plant. Can give the best of references and will consider no position unless steady. Address O-13, care THE METAL INDUSTRY.

DIRECTORY

METAL ROLLING MILLS.

INGOT, SHEET, ROD, WIRE, TUBE, METAL GOODS.

HENDRICKS BROTHERS
Manufacturers of
Sheet and Bar Copper
COPPER FIREBOX PLATES
and STAYBOLTS
WIRE and BRAZIER'S RIVETS
IMPORTERS AND DEALERS IN
INGOT COPPER, BLOCK TIN,
SPELTER, LEAD, ANTIMONY
BISMUTH, NICKEL, Etc.
49 Cliff Street, NEW YORK

Established 1802 Cable Address: "Scovill"
SCOVILL MFG. CO.
WATERBURY, CONN.
THE LARGEST AND MOST FULLY EQUIPPED BRASS ROLLING MILLS AND METAL GOODS MANUFACTURING ESTABLISHMENT IN THE WORLD
Estimates for Specialties in Brass, German Silver and Aluminum furnished on application. DEPOTS:
NEW YORK: 75 Spring St. BOSTON: 170 Summer St. CHICAGO: 210 Lake St.

WATERBURY BRASS CO.
General Offices, Mills and Factories.
Waterbury, Conn.
NEW YORK OFFICE, 99 JOHN STREET.
Providence (R. I.) Store, 131 Dorrance St.
Shipments Upon Receipt of Order
From Large Stock of
SEAMLESS DRAWN BRASS AND COPPER TUBING
BRASS {SHEET ROD WIRE
COPPER {SHEET ROD WIRE
GERMAN SILVER {SHEET ROD WIRE
AT WATERBURY

Non-Corrosive Finest Quality
COPPER AND YELLOW
(Muntz) Metal
Naval Brass
Naval Bronze
Manganese Bronze
Plates, Sheets, Bolts, Bars, Rods, Nails, Tacks, &c.
Taunton-New Bedford Copper Co.
NEW BEDFORD, MASS.
17 Water St., New York 61 Batterymarch St., Boston

C. G. HUSSEY & CO.
PITTSBURGH, PENNA.
Manufacturers of
COPPER
In Sheets, Plates, Rolls
ANODES
Tacks and Nails

Bridgeport Brass Co.
BRIDGEPORT, CONN.
Postal Telegraph Building,
Broadway and Murray St, New York
17 N. 7th Street, Philadelphia
Manufacturers of
Brass and Copper { Sheet Tubing Wire and Rods.
Metal Goods Made to Order from Sheet, Rod, Wire and Tubing

BRASS and COPPER in Sheets and Rolls
SILVER PLATED METAL
(for Coach Lamps)
BRITANNIA METAL
B. & M. BABBITT METAL
for Bearings
LINING METAL for Automobile Bearings and Copper for Electrical Purposes
H. K. & F. S. BENSON
GLEN RIDGE, N. J.

THE SEYMOUR MFG. CO.
SEYMOUR, CONN.
German Silver
BRASS, COPPER and BRONZE IN SHEETS, WIRE, RODS and TUBES
COPPER AND NICKEL ANODES
Resistance Wires, Wire, Shot Copper

ROME METAL CO.
ROME, N. Y.
MANUFACTURERS OF
SEAMLESS BRASS AND COPPER TUBING
SMALL SIZES THIN GAUGES
SPECIAL SHAPES
FOR ALL PURPOSES

The Ansonia Brass and Copper Co.
99 John St.- New York
MANUFACTURERS OF
BRASS and COPPER Sheets, Tubes, Rods and Wire
SOLE MANUFACTURERS TOBIN BRONZE
(Trade-Mark Registered)

PHENIX TUBE CO.
Manufacturers of
Brass and Bronze Iron Lined Tubes
Brazed Steel Tubes,
Round and Square.
Main Office and Mills: Brooklyn, N. Y. City Branch Offices: Chicago, San Francisco

Baltimore Copper Smelting and Rolling Company
BALTIMORE, MARYLAND
SHEET COPPER

"RIVERSIDE" German Silver
Phosphor Bronze
Sheets, Rods, Wire, Ingots, Castings.
Jewelers Bars and Alloys
The Riverside Metal Co.
Riverside, Burlington Co., N. J.

THE PHOSPHOR BRONZE SMELTING CO., Limited.
ELEPHANT BRAND
INGOTS CASTINGS WIRE RODS SHEETS Etc
— DELTA METAL —
CASTINGS, STAMPINGS AND FORGINGS